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PAWELSKA (KRYSTYNA & JANAS (JANINA). **Występowanie 'siateczkowej' formy żółtaczki wirusowej.** [The occurrence of a 'net' form of yellows virus.]—*Gaz. cukrown.*, **62**, 5, pp. 158–159, 1960. [Abs. in *Referat. Zh. Biol., 1961*, 8, Sect. B, p. 5, 1961.]

Serological examinations of plants infected by the normal form and the 'net' form of beet yellows virus, which appeared in Poland in 1959, showed that the latter was caused by a str. of β 4 [beet yellows] virus [cf. **39**, 400].

SADÝBEKOV (A. S.). Изучение распространения возбудителя корнееда Сахарной Свеклы. [A study on the distribution of the causal agent of black leg of Sugar Beet.]—Вестн. Акад. Наук Казах. ССР [*Vestn. Akad. Nauk Kazakh S.S.R.*], **17**, 3, pp. 110–113, 1961.

Studies under the aegis of the Inst. Microbiol. Virusol. Acad. Sci. Kazakh S.S.R., and the Dept of Soil Biol., Moscow Univ., showed that *Rhizoctonia* [*Moniliopsis*] *aderholdii* [**40**, 136] was the basic and most active pathogen in the beet growing areas of the Alma-Ata region during 1957–59, followed by *Pythium debaryanum*, which, however, is less widely distributed. These results clearly relate to the soil and climatic conditions.

KEYWORTH (W. G.) & HOWELL (J. SHEILA). **Studies on silvering disease of red Beet.**—*Ann. appl. Biol.*, **49**, 1, pp. 173–194, 2 pl. (9 fig.), 1 diag., 1961.

Observations and experiments in 1952–59 at the National Vegetable Res. Sta., Warwick, on silvering disease of red beet (*Corynebacterium betae*), noticed in part [cf. **33**, 6; **40**, 4], showed that the condition is most prevalent on seed crops of Cheltenham Green Top, though it affects other cultivars, often only slightly. *C. betae* is present in the tap-roots, stems, and leaves of systemically infected plants, causing veinal or uniform silvering of the leaves followed by wilting and death. External leaf infection induces the formation of silvered lesions on the laminae or leaf margins.

About 1% of the seeds from infected plants are themselves infected and these produce plants with systemic symptoms. This low incidence of seed infection and the considerable spread in steckling beds are noteworthy. The manner of spread and the mode of entry to the plant are not yet clearly understood. The disease is readily transmitted on knives used to cut infected roots. Seed treatment with streptomycin or erythromycin (200–400 μg./ml.) gave almost complete control.

DAVIS (A. C.), MCEWEN (F. L.), & SCHROEDER (W. T.). **Control of Pea enation mosaic in Peas with insecticides.**—*J. econ. Ent.*, **54**, 1, pp. 161–166, 1961.

In 1955 the incidence of the virus on vars. Perfection and Pluperfect was reduced in most of the experiments at N.Y. St. Agric. Exp. Sta., Cornell Univ., Geneva, by 3 applications of parathion (25% emulsifiable concentrate at $\frac{1}{4}$ lb./acre) at weekly intervals to control the aphid vector, *Macrosiphum pisi* [*Acyrthosiphon pisum*: **37**, 567]. Other treatments, including 2 applications of parathion at 10-day intervals, 1 of parathion followed 10 days later by demeton (26·1%) at the same rate, and 2 of the latter, gave more variable results depending on the timing of the 1st spray. Similar observations were made in respect of the non-persistent stunt and streak viruses.

In 1956, 3 treatments with diazinon at $\frac{1}{4}$ lb./acre gave good control of enation mosaic on Pluperfect, while parathion was again effective. Seed treatment with demeton slurry, 1 oz. in $\frac{1}{2}$ pint methocel solution, appeared to reduce the stands.

In no case were the yield increases from the treatments commensurate with the degree of virus control.

DAVEY (C. B.) & PAPAVIZAS (G. C.). **Aphanomyces root rot of Peas as affected by organic and mineral soil amendments.**—*Phytopathology*, **51**, 2, pp. 131–132, 1961.

Root rot of Alaska peas caused by *A. euteiches* [**40**, 196] was most effectively reduced by adding ground, mature or nearly mature oat plants and NH_4NO_3, singly or combined, to heavily infested greenhouse soil at U.S. Dept Agric., Beltsville, Md. N amendments were consistently more effective than Na [**34**, 829].

BAJAJ (B. S.) & DURBIN (R. D.). **The translocation of root-applied streptomycin in Bean.**—*Plant Dis. Reptr*, **45**, 4, pp. 260–262, 1961.

After 24-hour feeding periods at Univ. Minn., St. Paul, the bark of Pinto bean stems accumulated 2–6 times as much streptomycin applied in root solutions as did the wood. When each of the vascular tissues was selectively blocked, streptomycin was translocated upward chiefly in the xylem, and its presence in the bark indicates exchange between xylem and phloem.

NIKOLAEVA (Mme M. I.). Опыт использования фитонцидов для борьбы с болезнями Эспарцета и других растений. [An experiment in the use of phytoncides for the control of diseases of Esparcette Beans and other plants.]—Труд. Воронеж. Унив. [*Trud. Voronezh. Univ.*], **56**, 1, pp. 55–65, 1959. [Abs. in *Referat. Zh. Biol., 1961*, 10, Sect. G, p. 77, 1961.]

A report of further work on the action of phytoncides from clematis, onion, and garlic on the mycoflora of esparcette beans [*Onobrychis* spp.: **39**, 718]. An aqueous infusion of dry onion scales was also effective for the control of white rot [*Sclerotinia sclerotiorum*] and to some extent grey rot [*Botrytis cinerea*] of vegetables in storage.

PAPAVIZAS (G. C.) & DAVEY (C. B.). **Isolation of Thielaviopsis basicola from Bean rhizosphere.**—*Phytopathology*, **51**, 2, pp. 92–96, 1 fig., 1961.

At Beltsville, Md, colonies of *T. basicola* were obtained on dilution plates from the rhizosphere of Topcrop snap beans [*Phaseolus vulgaris*] grown in soil inoculated with endoconidia [cf. **39**, 411]. Virulent isolates yielded more colonies than mildly pathogenic ones. The soil type and conc. of inoculum also influenced the no. of colonies, which developed best on media incorporating oxgall and sodium propionate [**40**, 89]. About 100–1,000 endoconidia/g. oven-dry soil were required for infection. *T. basicola* could not be recovered efficiently from slightly diseased roots or from soils immediately after heavy infestation.

SMALE (B. C.), MONTGILLION (M. D.), & PRIDHAM (T. G.). **Phleomycin, an antibiotic markedly effective for control of Bean rust.**—*Plant Dis. Reptr*, **45**, 4, pp. 244–247, 2 graphs, 1961.

Phleomycin (*J. Antibiot.*, Ser. A., **12**, pp. 285–289, 1959) was shown in greenhouse studies to be effective for the prevention and cure of rust (*Uromyces phaseoli*) [*U. appendiculatus*] at 5 p.p.m. applied to upper surfaces of primary leaves of bean [*Phaseolus vulgaris*] up to 5 days before or after inoculation of the lower surface. The ED_{50} value was 0·1 p.p.m. for application to the upper primary leaf surface 1 hr before inoculation of the lower, and 0·01 p.p.m. if applied to the lower surface. No disease occurred when primary leaves were inoculated within 24 hr. of application of low concs. to roots or stems. Translocation is apparently associated with the transpiration stream.

Nilsson (L.). **Fettfläcksjuka på Bönor. En litteratursammenställning och en experimentell undersökning.** [Grease spot disease of Bean. A survey of the literature and an experimental investigation.]—*Meded. Växtskyddsanst., Stockh.*, **11**, 76, pp. 375–444, 7 fig., 4 graphs, 1960. [Engl. summ. 136 ref.]

Most of the material used in these studies from 1944–55 at the Åkarp branch of the Swedish Plant Protection Inst. was from Scania and Öland [map 85]. Reaction to *Pseudomonas medicaginis* var. *phaseolicola* [*P. phaseolicola*] was evaluated in the field on 29 vars. of *Phaseolus vulgaris* (classified according to 3 degrees of susceptibility, slight, moderate, and high), of which the old-fashioned 'brown' beans—large-seeded, luxuriant, and late-ripening—were the most susceptible.

Treatment of the seed either with fungicides or by immersion in hot water failed to give effective control, but spraying with 1% Bordeaux mixture was more successful, provided an early start was made, soon after germination. Applications at 10- and 20-day intervals reduced pod infection from 25 to 0·5 and 4%, respectively, whereas monthly treatments were practically without effect.

Jones (J. P.). **A weed host of Xanthomonas phaseoli var. sojense.**—*Phytopathology*, **51**, 3, p. 206, 1961.

Plants of *Brunnichia cirrhosa* naturally infected by *X. p.* var. *sojense* [**36**, 633; **40**, 151] were found in a field of heavily diseased soybeans at Stoneville, Miss., in Sept. 1959. Isolates from the weed caused typical symptoms on soybeans.

Frezzi (M. J.). **Enfermedades del Maní en la provincia de Córdoba (Argentina).** [Diseases of Groundnut in the province of Córdoba (Argentina).]—*Rev. Invest. agríc., B. Aires*, **14**, 2, pp. 113–155, 20 fig., 1960. [45 ref. Reprinted as *Publ. Estac. exp. agropec. Manfredi* 12, 1960.]

This detailed survey classifies the diseases into 3 groups. (1) Those affecting the roots and causing av. 10–15% losses annually; 15 pathogens are listed, of which *Rhizoctonia* [*Corticium*] *solani*, *Sclerotium rolfsii*, and *Fusarium* and *Pythium* spp. are the most widespread. (2) Those affecting the aerial parts, e.g. *Cercospora* [*Mycosphaerella*] *arachidicola* [map 166], and *C. personata* [*M. berkeleyi*], the former being predominant on cultivars, whereas the wild vars. are almost exclusively infected by the latter. (3) Diseases of minor importance, which include *Phyllosticta* sp., melanosis of the leaves, a condition resembling that described by Jenkins [**21**, 119], groundnut rosette virus [map 49], and 'apical necrosis' virus. The last [Costa: **21**, 119] causes wilting and necrosis of the terminal buds and some of the lateral branches, with swelling and sometimes deformation of the nodes and the internodes immediately below, while the leaves remain green and normal.

Helms (Katie), Grylls (N. E.), & Purss (G. S.). **Peanut plants in Queensland infected with Tomato spotted wilt virus.**—*Aust. J. agric. Res.*, **12**, 2, pp. 239–246, 2 pl. (9 fig.), 1961.

A disease of groundnut in Queensland, previously referred to as 'chlorosis', the symptoms of which are described [**34**, 274], was shown to be caused by tomato spotted wilt virus, and the name 'spotted wilt of groundnut' is suggested. *Erigeron bonariensis*, *Tagetes minuta*, and subterranean clover are recorded as new hosts. The disease was not seed-borne, but seeds developed lesions, and were malformed. Infective virus was found in tissues of the integuments of immature seed. Max. disease incidence recorded in an individual crop was 5·5%. The av. seed yield was 12·7 g./diseased plant compared with 128·2 g./healthy.

Ward (H. S.) & Diener (U. L.). **Biochemical changes in shelled Peanuts caused by storage fungi. I. Effects of Aspergillus tamarii, four species of A. glaucus**

group, and Penicillium citrinum.—*Phytopathology*, **51**, 4, pp. 244–250, 8 graphs, 1961.

The chief biochemical changes caused by the fungi isolated from stored groundnuts [**39**, 524] at Auburn Univ., Ala., were loss of organic matter, degradation of sucrose, decrease in total oil, and increases in free and unsaturated fatty acids. *A. tamarii* caused the greatest changes, and *P. citrinum* the smallest. The oil was turned reddish-orange and had a mouldy-acrid smell.

Protsenko (A. E.) & Legunkova (Mme R. M.). Электроноскопия вирусов мозаики Лука. [Electronoscopy of Onion mosaic viruses.]—*Microbiology, Moscow*, **30**, 1, pp. 165–167, 4 fig., 1 graph, 1961. [Engl. summ.]

In leaf tissue of onion plants naturally and artificially infected by onion mosaic virus [**40**, 448] at the Inst. Microbiol., Acad. Sci. U.S.S.R., there were filiform (675 and 1,500 mμ), and spherical (200 mμ) virus particles. It has not been possible to distinguish between the 3 virologically or to obtain symptoms from each.

Watson (R. D.). **Rapid identification of the Onion pink root fungus.**—*Plant Dis. Reptr*, **45**, 4, p. 289, 1961.

At Univ. Idaho, Moscow, it was found that *Pyrenochaeta terrestris* [**40**, 328], apparently alone among fungi, produces a pink to dark red colour, sometimes becoming nearly black, on wheat straw. For identification the roots or stem+roots, surface-disinfected with bleaching powder (1:4 water for 2–4 min.), are placed on agar incorporating the chopped straw sterilized with propylene oxide. When the fungus meets the straw the pink colour appears in 6–21 days.

Elenkov (E.). Борба с болестите Лука. [Control of Onion diseases.]—Градинарство [*Gradinarstvo*], **3**, 4, pp. 27–29, 1961.

Measures recommended by Plovdiv sci. Res. Inst. Vegetable Crops, Bulgaria, to control mildew [*Peronospora destructor*] and neck rot [*Botrytis* spp.: **35**, 623] of onion include choice of site where infected onions have not been grown for 4 yr., selection of dry, healthy bulbs previously treated with germisan at 500 g./100 kg., wide spacing, and avoidance of excessive N [cf. **39**, 525] and excessive watering towards maturity. If conditions favour mildew the plants should be sprayed every 4–6 days with lime-sulphur (2:100) at 150–200 l./dekar with a wetter, or once between 15 and 20 May if they do not. Harvested bulbs, cut well below the neck, should be stored in ventilated rooms at 30–35° C. for 15–20 days.

Diseases of Carrots and Parsnips.—*Tasm. J. Agric.*, **32**, 1, pp. 63–67, 7 fig., 1961.

Symptoms and control of the following diseases are briefly noted: carrot motley dwarf virus [cf. **33**, 337], disastrous on susceptible vars., leaf blight (*Alternaria dauci*) [map 352], widespread and sometimes severe, and *Cercospora* blight (*C. carotae*) on carrot, storage bacterial soft rot (*Erwinia carotovora*), root rot (*Phytophthora megasperma*) [**24**, 487], cottony rot (*Sclerotinia sclerotiorum*), and soft root rot (*Sclerotium rolfsii*), rare, on both hosts, and canker (*Itersonilia perplexans*) [cf. **38**, 562], common and often serious, and leaf spot (*Phyllachora pastinacae*) on parsnip.

Wilson (J. D.). **Oils reduce sporulation of Septoria on Celery.**—*Plant Dis. Reptr*, **45**, 4, pp. 282–285, 2 fig., 1961.

At Ohio agric. Exp. Sta., Wooster, 2 petroleum oils greatly reduced the formation of pycnidia in lesions of celery blight (*Septoria apii*), though having little effect on initial infection. Thus secondary infection was reduced and the disease checked to some extent. Formulated with oil, the effectiveness of tribasic and ziram was increased to a greater extent than that of maneb and dyrene.

Feldman (J. M.) & Pontis (R. E.). **La podredumbre rosada del Apio en La Argentina causada por 'Sclerotinia sclerotiorum'.** [Celery pink rot in Argentina caused by *S. sclerotiorum*.]—*Rev. argent. Agron.*, **27**, 1–2, pp. 15–26, 3 pl. (9 fig.), 1960. [Engl. summ. 42 ref.]

Further details of information already noticed [**38**, 645]. The symptoms and experiments on etiology are described and the literature, especially that on control, is reviewed.

Johnson (K. E. E.), Davis (J. F.), & Benne (E. J.). **Occurrence and control of magnesium-deficiency symptoms in some common varieties of Celery.**—*Soil Sci.*, **91**, 3, pp. 203–207, 1961.

In experiments in 1953–4 at 4 locations in Mich. [**37**, 435] on 19 celery vars., including 4 types of Pascal, 3 of Utah, 2 each of Earligreen and Cornell, and 5 of various kinds of Golden, sprays of $MgSO_4$. $7H_2O$ at 84 lb./acre fortnightly, starting 2–3 weeks after transplanting (June 21, 22, and 30), were more effective in alleviating Mg deficiency symptoms [**39**, 761] than broadcast soil treatments at 750 lb./acre. The symptoms disappeared with an increase in the min. Mg content from between 0·112 and 0·128% dry wt. to 0·144. Higher Mg contents were generally accompanied by a fall in Ca and K.

Gambogi (P.). **La maculatura fogliare dello Spinacio da Cladosporium variabile (Cke.) de Vries. I. Alcuni caratteri morfologici e fisiologici del parassita.** [Leaf spot of Spinach caused by *C. variabile*. I. Some morphological and physiological characters of the parasite.]—*Agricoltura ital.*, **60** (N.S. **15**), 12, pp. 385–414, 6 fig., 15 graphs, 1960. [Engl. summ. 15 ref.]

Studies at Univ. Pisa on *C. variabile* [cf. **40**, 449], occurring locally on spinach, are fully described, including the morphology of the fructifications and mycelium, the influence of various factors on growth in culture and on conidial germination, and pigment production. Further work is in progress.

Schnathorst (W. C.). **Heterothallism in the Lettuce strain of Erysiphe cichoraceae-arum.**—*Mycologia*, **51** (*1959*), 5, pp. 708–711, [1961. 7 ref.]

In further work at Univ. Calif., Davis [**39**, 762], *E. cichoracearum* from lettuce, grown on detached leaves, was found to be heterothallic. The 2 mating types occurred with about equal frequency. Perithecia formed as readily on leaves of cultivated lettuce as on the wild (*Lactuca serriola*). A str. pathogenic to *Zinnia elegans* and wild lettuce but not to the cultivated formed perithecia with the cultivated str.

Babayan (A. A.), Khodzhayan (E. A.), Grigoryan (N. F.), & Stepanyan (T. G.). Современное состояние изученности увядания Бахчевых культур и разработка мероприятий по борьбе с ними. [The present position in the study of wilt in Cucurbit crops and the elaboration of controls.]—Изв. Мин. сел. Хоз. Армян. СССР [*Izv. Min. sel. Khoz. Armyan. S.S.R.*], Ser. Agric., *1960*, 7, pp. 57–66, 1960. [Arm. with Russ. summ. Abs. in *Referat. Zh. Biol.*, *1961*, 9, Sect G, p. 76, 1961.]

Melon, watermelon, and cucumber suffer serious losses on the Ararat plain from *Fusarium oxysporum* [**38**, 442]. Means of infection and spread were studied. Granosan (5–6 g./kg. seed) gave a 20% increase in seed germination and 7–17% increase in vigour.

Baluł (Wanda). **Doświadczenia nad patogenicznością gatunków Fusarium występujących na Dyni oleistej.** [Experiments to determine the pathogenicity of fungi of the genus *Fusarium* infecting Oil Squash plants.]—*Prace. Inst. Ochr.*

Rośl., **1**, 3, pp. 163–186, 1959. [Russ., Engl. summ. Abs. in *Referat. Zh. Biol., 1961*, 5, Sect. G, p. 78, 1961.]

At the Inst. Plant Protect., Reguły, Poland, in 1957–8, inoculation of the seed and fruit of oil squash with 9 *Fusarium* isolates [**39**, 529] gave a 65% reduction in germination at 10–12° [C.] and 30% at 26–30°. *F. sporotrichioides*, *F. avenaceum*, *F. a.* var. *graminum*, and *F. oxysporum* were the most pathogenic. Immature fruits were the most susceptible.

Hunte (W.). **Champignonanbau im Haupt- und Nebenerwerb.** [Mushroom-growing as a main and subsidiary enterprise.]—127 pp., 79 fig., 5 diag., 4 graphs, Berlin, Paul Parey, 1961. (5th, revised, ed.) DM. 12.80.

Pp. 92–99 of this practical book on all aspects of mushroom cultivation are devoted to the most common diseases with brief descriptions of symptoms, occurrence of the causal agents, and some control measures.

Baldacci (E.), Amici (A[driana]), Belli (G.), Betto (E.), Bonola (P.), Fogliani (G.), Giussani (G.), & Refatti (E.). **Ricerche sulle malattie da virus della Vite : semeiotica, etiologia, perpetuazione e prevenzione.** [Researches on virus diseases of the Vine: symptoms, etiology, perpetuation, and prevention.] —*Riv. Pat. veg. Pavia*, Ser. 3, **1**, 2, pp. 114–231, 1 col. pl. (4 fig.), 4 fig., 1961. [Engl. summ., 2 pp. 77 ref.]

Much of the information in this detailed account of studies (begun in 1950) during 1958–60 at Univ. Milan on infectious degeneration of the vine [**40**, 575, *et passim*] has been noticed. It covers symptoms not previously recorded, known malformations, changes in leaf colour, comparisons with deficiency disorders and insect injuries, notes on the collections of vines studied, transmission to vines and to herbaceous [**40**, 451] and woody plants [**39**, 208], electronic microscope studies, perpetuation by vegetative reproduction [**37**, 569], and preventive control by clonal selection, the chemical killing of diseased vines, soil disinfection, and the development of resistant vars.

Khristov (A.). Етиология на чернилката по Лозата в България. [Etiology of the black spot of Vine in Bulgaria.]—Раст. Защ. [*Rast. Zasht.*], **9**, 2, pp. 27–36, 5 fig., 1961. [Russ., Engl. summ. 23 ref.]

At the Higher agric. Inst. G. Dimitrov, Sofia, inoculation *in vitro* of vine cuttings with bacteria isolated from diseased tissue produced an infection of cambium and xylem in the form of small, superficial, yellowish or light brown, oval or lance-shaped wounds, which increased and formed yellow and brown scars and stripes. Cultural experiments indicated that black spot [spotted necrosis: **40**, 576] of vine is of bacterial origin and that the fungi involved [cf. **39**, 369]—grey mould [*Botrytis cinerea*] and *Trichothecium roseum* were isolated—are secondary, able only to enlarge the wounds. The bacterium concerned has not yet been identified.

Gambaryan (G. S.). Аммиачный раствор цинковой соли салицилanилида против мильдью. [Ammonium solution of the zinc salt of salicylanilide against mildew.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 5, pp. 27–28, 1961.

At Inst. Viticulture, Wine-making, and Fruit-growing, Min. Agric. Armenian S.S.R., a 1:25 water suspension of 30% sol. of this salt, sprayed on vine to control mildew [*Plasmopara viticola*: cf. **40**, 203], gave the same results as 1% Bordeaux mixture, while suspensions of 1:50–300 were inferior.

Storozhenko (E. M.). Белая гниль Винограда и меры борьбы с ней [White rot of Vine and control measures.]—*Ex* Итоги н.-и. Работы Сев.-Кавказск. зонал. н.-и. Инст. садовод. виноградарст. [Results of the sci.-Res. Work of the N.

Caucasus regional sci.-Res. Inst. for Horticulture and Viticulture.], Krasnodar, pp. 296–336, 1959. [Abs. in *Referat. Zh. Biol., 1961*, 9, Sect. G, p. 79, 1961.]

In Kuban conditions *Coniothyrium* [*Coniella*] *diplodiella* [**38**, 443; **40**, 576] infects chiefly the grapes, while infection of shoots is mild, and is absent from the leaves. Damage from hail, sun, mechanical wounding, and mildew [*Plasmopara viticola*] provides infection points. The incubation period is 3–12 days. Opt. temp. is 25–27° [C.]. Infection occurs below 12 and above 33°, but pycnidia are not formed. The sclerotia form on infected berries in autumn and summer when these dry quickly. The pathogen retains its viability for 2–3 yr. on berries both in the soil and in the air. Spraying with 4% Bordeaux mixture, 15% thiram (1–4%), or 50% thiram (1% suspension) gives effective control.

Cook (J. A.), Lynn (C. D.), & Kissler (J. J.). **Boron deficiency in California vineyards.**—*Amer. J. Enol. Vitic.*, **11**, pp. 185–194, 1960. [*Chem. Abstr.*, **55**, 10, col. 9586 f, 1961.]

Cook (J. A.), Bearden (B. E.), Carlson (C. V.), & Hansen (C. J.). **Boron deficiency in vineyards.**—*Calif. Agric.*, **15**, 3, pp. 3–4, 2 fig., 1961.

Information is presented on incidence, symptoms, and treatment, supplemented by analytical data on the B content of the various organs. Deficiency is indicated if the petioles of leaves adjoining clusters contain less than 30 p.p.m. at flowering time.

The 2nd paper notes that chlorosis of terminal leaves and death of growing points of vines in Mendocino County in 1957, caused by B deficiency [cf. **36**, 167], were corrected by 2 oz./vine 44% boric oxide, broadcast, and in Merced County by 1 oz./vine 36% boric oxide applied in the irrigation furrow. Leaf symptoms of B deficiency resemble those caused by Pierce's disease [lucerne dwarf virus: **37**, 629], but the latter affects basal leaves first. Applications of ½ oz./vine of a strong B fertilizer (or more of a weaker) provide sufficient B for several yr. Excessive B fertilization may cause toxicity, particularly in sandy soils.

Gärtel (W.). **Distribution of potassium and magnesium in Grapes under normal nutrition and potassium deficiency.**—*Weinberg u. Keller*, **7**, pp. 481–489, 1960. [German. *Chem. Abstr.*, **55**, 10, col. 9752 c, 1961.]

Analyses at the Inst. Rebenkrankheiten, Bernkastel-Kues, Germany, revealed large variations not only in the absolute K values but in the ratio K: Mg between healthy and K-deficient vines [**39**, 71, 531].

Plant Pathology Division.—*Res. & exp. Rec. Minist. Agric. N. Ireland*, **9** (*1959*), 2, pp. 207–226, 1960.

In the annual tests detailed in this report [cf. **39**, 455] seed contamination by *Fusarium nivale* [*Calonectria nivalis*] was estimated at approx. 14·3 for oats and 10% for barley, and by *F. avenaceum* [**38**, 388] 7·7 and 11·5%.

Secondary symptoms of infection by potato virus Y [loc. cit.], detected for the 1st time on some vars., were classified as chlorotic mottle, rugosity and stunted growth (Up-to-Date, Stormont Dawn, and Bintje); the same + veinal necrosis or necrotic spotting of the lower leaves (Ulster vars. Malta, Beacon, Torch, Ranger, Tarn, and Glen); and mild diffuse mottle and rugosity with slight reduction in vigour (Dunbar Standard). Potato viruses X, Y and its veinal necrosis str., and A [**40**, 378] reacted similarly to various methods of storage at —6° C.; infectivity determined by sap inoculation to indicators was lost most quickly in whole-leaf samples followed by minced samples and retained longest (virus X 2–3 yr.) in crude sap stored in stoppered glass tubes.

The 4 strs. of virus A [loc. cit.] are distinguished by severe, moderately severe (both from Ulster Torch), mild (Irish Chieftain), and very mild (Ulster Torch and Golden Wonder) types of infection.

Manzate at the highest dosage reduced the number of Enfield Market cabbage plants infected by *Plasmodiophora brassicae* [**40**, 3, 5] to 0·25% when seed was sown in compost inoculated and mixed with fungicide; a thiram preparation also gave good control; none of the treatments was phytotoxic.

Further studies indicate that the lenticels in apples grown in N. Ireland are generally slightly more resistant to penetration by *Penicillium expansum* than those of fruit from G.B., though exceptions were found in some orchards.

Samenvattingen van de voordrachten, gehouden op de planteziektendagen, 2 en 3 Maart 1961, te Wageningen. [Summaries of lectures delivered during the plant disease conference, 2–3 March 1961, at Wageningen.]—Abs. in *Tijdschr. PlZiekt.*, **67**, 2, pp. 57–68, 1961.

Of the 27 papers covered [cf. **39**, 71] some have been noticed [**40**, 515]; others are H. Van Os, [Experiences with the meristem culture of carnations], on heat treatment to obtain virus resistant plants; P. Harrewijn, [*Didymella applanata* on raspberry], concerning investigations on conditions for leaf infection [**39**, 426]; A. F. H. Besemer & P. J. Taconis, [Experiences with mildew control in several plants], giving results with various fungicides against *Oidium* on ornamentals etc.; R. E. Labruyère, [The conduct of scurf and *Rhizoctonia* on potato in the new polder of Eastern Flevoland], suggesting the use of buffer strips between potato and other fields to limit spread of *R.* [*Corticium solani*: **38**, 421]; and T. de Bruin, [Influence of leaf removal by machine on infection of potato tubers by *Phytophthora infestans*], reporting that herbicide sprays reduced infection by half.

Böning (K.), Mallach (N.), Sprau (F.), & Wagner (F.). **33. Deutsche Pflanzenschutz-Tagung in Freiburg/Br. 1960.** [Thirty-third German Plant Protection Conference in Freiburg/Br., 1960.]—*Pflanzenschutz*, **12**, 11–12, pp. 171–177, 1960.

At this conference [cf. **39**, 264] [K.] Schuch, Heidelberg, reviewed the question of testing fruit trees for viroses. [K.] Naumann, Münster, described a test for stone fruit viruses by which Stecklenberg [? peach ring spot str.] and cherry yellows virus can be demonstrated on severed cucumber cotyledons [cf. **40**, 233]. [H.] Kegler, Aschersleben, claimed that the ordinary cucumber test was positive only to a certain, insufficient extent and could not be greatly improved even by additives. [R.] Bercks remarked that the addition of nicotine or sodium sulphate improved inoculation transmission to herbaceous plants.

[A.] Schmidle, Heidelberg, reported on bark rot of peach caused by *Fusicoccum* and *Valsa cincta*, which penetrate wounds or leaf scars, sometimes forming cankers on older growths. Spraying with Cu preparations was effective. [J.] Schwinn, Bonn, described the isolation of *Phytophthora cactorum* [**40**, 365] from the soil, using Cox's apples as bait. When the fungus is found in an orchard prophylactic measures, such as application of fungicides, concentrated fertilizing, and enrichment of humus, can be started [cf. **40**, 547].

Thate, Neustadt, described symptoms of vine apoplexy as sudden wilting and withering of individual roots, the dried leaves remaining attached longer in the autumn. Young plants in particular are attacked. The following yr. there is only partial development of the shoots, though the roots are healthy. Brown patches with tyloses appear in the wood. Frequently since 1953 *Verticillium alboatrum* has been established as the agent. [W.] Gärtel, Bernkastel, demonstrated that Cu preparations used against *Peronospora* [*Plasmopara viticola*] reduced pollen ger-

mination more than organic fungicides: of the latter maneb and thiram were the most inhibitory.

[G.] Crüger, Fischenich, referred to the round white spots with necrotic centres on tomato fruits caused by *Corynebacterium michiganense* [**32**, 155]. The wilt symptoms which also occur are more pronounced on mineral soils than on those rich in humus. Root infection through wounds is suspected. The usual fungicides are ineffective; streptomycin was more satisfactory, though not completely so.

[H.] Kröber, Berlin, dealt with *Peronospora tabacina* on tobacco [**40**, 629] and Paveling, Forchheim, with control. [K. H.] Domsch, Kiel, reported that allyl alcohol [**38**, 455] was as effective as vapam against *Thielaviopsis* [*basicola*: **40**, 385]. Of the materials suitable for use on standing crops, zineb and captan gave less lasting results than tuzet; methyl arsine sulphate at 50 kg. ha. proved particularly effective. In a discussion following the paper by [O.] Bode, Brunswick, on the importance of virus diseases in tobacco cultivation and possibilities for their control, K. Böning, Munich, pointed out that cucumber mosaic and tobacco mosaic viruses can produce fern-like leaf distortions which may be confused with damage caused by hormone sprays.

Démétriadès (S. D.), Zachos (D. G.), Panagopoulos (C. G.), & Holevas (C. D.). **Rapport sommaire sur les maladies des plantes cultivées, observées en Grèce au cours de l'année 1959.** [Brief report on the plant diseases observed in Greece during the year 1959.]—*Ann. Inst. phytopath. Benaki*, N.S., **3**, 2, pp. 33–41, 1960.

This report [cf. **39**, 210], compiled on the usual lines, includes the 1st record of *Pseudomonas sesami* on sesame in Greece. *P. tabaci* caused considerable damage to tobacco in some areas.

Report of the Waite Agricultural Research Institute, South Australia, 1958–1959. —58 pp., [? 1961].

In the Plant Path. sect. (pp. 36–40) of this biennial report [cf. **38**, 380] it is stated that a str. of *Rhizoctonia* [*Corticium*] *solani* attacking cereal coleoptiles before or immediately after seedling emergence caused serious reduction of establishment in many of the more lightly textured soils. Inoculations on potatoes disclosed different pathogenic strs. of *Phytophthora infestans* [**40**, 425]. Black mould (*Chalaropsis thielavioides*) [cf. **33**, 85] caused serious failure in borsault stocks in rose nurseries.

N. T. Flentje, A. Kerr, & R. L. Dodman report that the growing tip of *Pellicularia filamentosa* [*Corticium solani*] appears to contain 8 nuclei which congregate and divide simultaneously at a certain stage of elongation of the tip; 8 daughter nuclei migrate back and 8 to the tip, this being followed by the formation of a septum. Cell division and branching occurred in a regular pattern. The number of nuclei in the tip cells of *P.* [*C.*] *praticola* [**37**, 522] is less regular, as is septum formation and mode of branching, though the progress of nuclear division is similar to that in *C. solani*. Root exudates from different hosts specifically stimulated different strs. of *C. solani*, stimulation in general paralleling the specificity in pathogenicity of the strs. In collaboration with M. R. Atkinson chemical substances exerting specific effects on growth rate and type of branching of the radish-infecting str. of *C. solani* [**36**, 343] were isolated from radish root exudate and purified; a derivative of nicotinic acid is probably involved.

In work by A. Kerr, M. V. Carter, & J. Nath crosses were made between the American pea var. New Era, resistant to *Fusarium oxysporum* f. *pisi* race 2 [cf. **39**, 756], and the locally grown susceptible Greenfeast and Victory Freezer; homozygous wilt-resistant lines of Greenfeast were selected from the 4th back-cross. Soil treatments with vapam [cf. **40**, 520], applied even by the most effective methods, failed to prevent re-colonization by *Fusarium* spp.

At the Botany School, Cambridge, A. KERR obtained 15 isolates of organisms antagonistic to *Verticillium alboatrum* from the surface of tomato roots growing in natural, untreated soil; 10 were identified as *Pseudomonas fluorescens* and 2 as *Streptomyces* spp.; 3 were unidentified spp. of bacteria. When tomato seeds and the roots of young seedlings were inoculated with 1 isolate of *P. fluorescens* and placed in untreated soil, populations of the antagonist on the roots determined at weekly intervals were found to decline rapidly. Inoculations of tomato seedlings with several of the antagonists separately did not reduce infection by *V. alboatrum*.

N. T. FLENTJE, J. H. WARCUP, & J. B. TAYLOR state that *V. alboatrum* is common in cultivated soils in S. Australia in association with stone-fruit trees. B. G. CLARE reports the presence of what appears to be a str. of *Urophlyctis* [*Physoderma*] *alfalfae* [cf. **39**, 323] attacking only subterranean clover.

Investigations by M. V. CARTER & W. J. MOLLER on *Mycosphaerella pinodes* [cf. **39**, 646] on peas in S. Australia showed that the fungus remained viable in dry, stored pea straw for 12 months and readily ejected viable ascospores when wetted. Discharge did not occur from infected straw buried for 6 days in warm, moist soil, but ascospores appeared to develop into chlamydospores capable of infecting plants. Chemicals sprayed on to straw, which eradicated the fungus in laboratory tests, failed to give satisfactory control in the field. Spore trappings throughout the growing season revealed a slow build-up of ascospore inoculum in the early stages of crop growth, probably from perithecia in straw from the previous crop.

N. C. CROWLEY states that the vine virus indicator var., St. George, resistant to *Phylloxera* [*vastatrix* f. *radicicola*], was introduced for the investigation of virus diseases present in S. Australia. By using the herbaceous host range employed by Fulton for the identification of stone fruit viruses [**36**, 599], an isolate from cherry was identified as near to Fulton's virus B [**39**, 331]. One other isolate did not resemble any of those described by him.

CREELMAN (D. W.). **A summary of the prevalence of plant diseases in Canada in 1960.**—*Canad. Pl. Dis. Surv.*, **41**, 2, pp. 31–121, 1961.

Among new and noteworthy diseases (pp. 31–33) [cf. **40**, 1] *Sclerophthora* [*Sclerospora*] *macrospora* [map 287], not previously reported in Canada, has been found on wheat in N.B. *Drechslera* [*Pyrenophora*] *teres* was the most important leaf disease of barley in western Canada. In Que. the decline and phyllody virus [strawberry green petal virus: cf. **37**, 243, 516] continues to be serious on red, alsike, and ladino clovers. The most serious recorded outbreak of *Rhizoctonia* [*Corticium*] *praticola* [cf. **33**, 722] on flax is reported from Sask. *Cladosporium cucumerinum* caused heavy losses to cucumber in western Ont., Que., and N.B., and there was an unusually high incidence of *Colletotrichum lagenarium* on melon in western Ont. *Urocystis cepulae* on onion was more serious in B.C. and Man. than in recent years. *Phytophthora infestans* was virtually absent from the 1960 commercial potato and tomato crops. *Centrospora acerina* [cf. **38**, 121] was again extremely severe in commercial pansy plantings in N.S., and *Peronospora grisea* [cf. **29**, 620] was reported on *Veronica* from N.B.

Annual Report, Department of Agriculture, Kenya, 1959. Vol. II. –174 pp., 1961. Sh. 7/50.

The senior plant pathologist, E. HAINSWORTH, reports (pp. 15–20) [cf. **39**, 656] that diseases of major severity on crops occupying over 30,000 acres and which show promise of early control by suitable measures now form the main part of the section's programme. In outstanding need of attention are seed-borne diseases, especially of cereals and legumes. Full control of seed-borne *Rhynchosporium*

secalis, *Cochliobolus sativus*, and *Pyrenophora teres* on barley was obtained with organo-Hg seed dressings at an adequate dosage level of Hg. Potato bacterial wilt (*Pseudomonas solanacearum*) commonly causes losses of 50–70 or even 100%; in 1959 the av. was 20%. The disease also attacks tomatoes but other crops do not appear to be affected.

In the report of the plant pathologist (plant breeding, pp. 56–59) E. J. Guthrie states that race K 16 of wheat stem rust (*Puccinia graminis*) [**40**, 293] became the 4th commonest, the most prevalent being K 13 and K 18; K 19 (international race 189, the most virulent known) is potentially very dangerous. K 13 appears to be intermediate between international races 24 and 42, which are differentiated mainly on Khapli; it may be that more than 1 form exists. K 16, 17, and 18 are equivalent to race 40, and may be regarded as sub-races of it.

Some of the information given by I. D. Firman (plant pathologist, coffee services, p. 71) has been noticed [**40**, 416]. Race VII of *Hemileia vastatrix* [cf. **40**, 169] has not been detected since 1957. $CuSO_4$ sprays containing 5,000 p.p.m. or more of Cu caused numerous brown, necrotic spots on the leaves of sprayed coffee, but there was little or no effect at lesser concs. [cf. **40**, 307]. Three main types of symptoms of coffee stem-pitting [**40**, 148] were recognized locally: gum pockets and small pits in the wood cylinder with corresponding pegs in the phloem; typical furrowing and stem deformation; and furrowing associated particularly with the capping zone. The symptoms often start in very young seedlings.

Plant Pathology.—*Rep. Dep. Agric. Mauritius, 1959*, pp. 41–49, 1961.

Some of the information in this report [cf. **39**, 373] has been noticed [**39**, 678; **40**, 74]. *Marssonina panattoniana* [map 82] on lettuce, *Helminthosporium* [*Deightoniella*] *torulosum* [175] on banana, *Alternaria porri* [350] on garlic, leek, and particularly onion, and *A. dauci* [352] on carrot were new records for Mauritius. The recently recorded *Mycosphaerella musicola* occurs on the dwarf banana [*Musa cavendishii*], the main local var., and is not at present serious.

Cercospora nicotianae was identified on old tomato leaves. In tobacco seedbeds receiving vapam drenches and zineb sprays there was very little scab (*Septomyxa affinis*) and leaf spotting; a bacterium isolated from the spots reproduced them on inoculation. *Colletotrichum camelliae* caused severe defoliation of tea seedlings in the field. Potato plants free from blight (*Phytophthora infestans*) were often severely affected by leaf scorch associated with *Pseudoplea trifolii*, *Stemphylium solani*, and other fungi; *P. trifolii* also occurred on younger groundnut leaves, causing chlorosis and tip spotting. Cauliflower was affected by a bacterial leaf spot (*Pseudomonas maculicola*). A new leaf spot on tomato was caused by a *Mycosphaerella* sp.; also new were *Ascochyta cucumis* and *Cercospora* [*M.*] *citrullina* on some cucurbits [cf. **39**, 678], often killing the leaves, *Pseudocercospora citis* on a local var. of grapevine, and *Phyllosticta hortorum* on eggplant, though less important than *C. melongenae* which may cause severe defoliation. Several banana vars. were affected by a mosaic (? cucumber mosaic virus). *Dendrophoma obscurans* and *M. fragariae* on strawberries were controlled by captan sprays. A dieback of rose was caused by *Phomopsis vepris* and a collar and branch rot of carnation associated with *Alternaria ? dianthi*.

Also recorded for the 1st time in Mauritius were: *C. mali* on apple; *Phyllosticta phaseolina* on bean [*Phaseolus*]; *Septoria apii* on celery; *Pestalotiopsis royenae* and *Glomerella cingulata* on coffee, and the latter also on black pepper; *P. versicolor* on tea; *Melampsora euphorbiae* on *Euphorbia pulcherrima*; *Cerotelium fici* on *Ficus pumila*; *A. tenuissima* on lettuce, mango, potato, and tomato; *Cladosporium sphaerospermum* on maize; *Cercospora fukushiana* on *Impatiens balsamina*; *C. tageticola* on marigold; *S. petroselini* on parsley; and *C. solanicola* and *Phyllosticta* sp. on potato.

VASUDEVA (R. S.). **Report of the Division of Mycology and Plant Pathology.**—*Sci. Rep. agric. Res. Inst. N. Delhi, 1957–1958*, pp. 111–130, 1960.

Some items in this report [cf. **39**, 372; **40**, 10] have been noticed. The biotype 21-B of *Puccinia graminis*, isolated from the 1956-7 wheat crop, was more virulent than 21 and 21-A. Races 42-B, 21, and 40 of *P. graminis* [**40**, 36], 20, 77, and 107 of *P. triticina* [*P. recondita*], and 19, 'A', 31, and 'G' of *P. glumarum* [*P. striiformis*] were predominant and widespread throughout the county. The virulent race 122 of *P. graminis*, which had not been encountered during the previous 2 yr., was again picked up. Comparative studies of *P. graminis* showed that race 75 had a longer incubation period than other races by 5–6 days at 20–25° C. while race 34 produced uredospores smaller than those of other races by about 3 μ. During the last 3 yr. the wheat vars. E. 2327 and Australian (1) were consistently resistant to *Tilletia foetida* and *T. caries*. Khapli was immune from *Erysiphe graminis*, Vernal and Einkorn were resistant. Two races of *P. hordei*, provisionally designated H1 and H2 (a new race), and a biotype of the former were encountered on barley. Of 4 *Oxalis* spp. inoculated with the germinating teleutospores of *P. sorghi* from maize [cf. **38**, 257] in the greenhouse, only *O. corniculata* became infected.

Perithecia of *Colletotrichum falcatum* [*Glomerella tucumanensis*] were readily formed on dried autoclaved sugarcane leaves when incubated in contact with water at 25°. Opt. growth of *Phomopsis vexans* from eggplant [**37**, 569] was at 17–30° and opt. sporulation at 20–25°.

Losses assessed included up to 30% of potato from blight (*Phytophthora infestans*), about 23% in pea pod yield from powdery mildew (*Erysiphe polygoni*), and 0–88% of groundnuts from [groundnut] mosaic virus.

A bacteriophage for *Xanthomonas citri*, isolated from diseased leaves, was host specific. A medium of glucose, $(NH_4)_2SO_4$, KCl, $MgSO_4$, and yeast extract was most suitable for both lysis and plaque formation, for which 27° and pH 7·5 appeared opt.

Of 4 viruses isolated from eggplant 1 was tobacco mosaic virus str., another was suspected to be cucumber mosaic virus str., and 2 appeared to be new for this host.

A severe type of mosaic was observed in the sugarcane var. Co. 527. 'Grassy-shoot' virus was transmitted to Napier grass (*Pennisetum purpureum*) and *Phaseolus vulgaris* both by mechanical inoculation and through the vector *Longiunguis sacchari*. *L. pseudosacchari* and *Aphis maidis* were also vectors of the virus, which withstood dilution of 1:10,000. All of 8 sugarcane vars. tested for resistance proved susceptible. The virus causing mosaic of *Physalis peruviana* was identified as tobacco mosaic virus str.

Mango malformation disease [cf. **39**, 75] was successfully transmitted by wedge grafting. Proof of its systemic nature was established by its reappearance in plants regularly sprayed with ekatox after removal of the diseased parts. Bunchy-top [**34**, 466] symptoms were produced on mango stocks wedge grafted with shoots from plants with malformed inflorescences, demonstrating that the 2 types of symptoms are caused by the same virus. The disease could not be transmitted through soil or mechanical injury of the roots or growing shoots.

Recorded for the 1st time in India are 19 *Cercospora* spp. [**40**, 345], including *C. cruciferarum* on radish, *C. davisii* on *Melilotus parviflora*, *C. jujubae* on *Zizyphus jujuba*, *C. malayensis* on *Hibiscus sabdariffa*, *C. psoraleae* on *Cyamopsis tetragonoloba*, *C. riachueli* on vine, *C. rubrotincta* on almond, *C. ubi* on yam, and *C. zebrina* on clover. Other new records included *Microsphaera alni* on walnut, *Sphaerotheca fuliginea* on cosmos, *Erysiphe umbelliferarum* on carrot, and *Polystigma rubrum* on almond [cf. **25**, 170; **32**, 474].

Department of Agriculture in Mysore State. Annual administration report for the year 1956–57. Volume I.—xvii+568 pp., 1960. [Received June 1961.]

In the sect. of this report [cf. **37**, 203 and above] on plant pathology (pp. 54–60)

N. S. Venkatakrishnayya reports that the incidence of 'hidimundige roga' disease of areca palm [**37**, 204] is said to range from 2–6% in the area in general, and from 20-60% in a few severely affected gardens. A new disease of areca palm called 'thonde roga' is reported from parts of Sagara and Koppa Taluks. Incidence was 15–20% and it was virulent on palms of all ages. The symptoms, which varied in different areas, included yellowing of leaves, tapering growth, and very poor bearing. The roots of affected palms slowly dried and crumbled and the crown ultimately fell.

Of 5 fungicides tested against root and foot rot and leaf blight (*Helminthosporium nodulosum*) of ragi [*Eleusine coracana*: **34**, 517; cf. **37**, 78] ceresan gave the best control.

Rust (*Puccinia crianthi*) [**39**, 39] on sugarcane is spreading to areas in Mysore other than Hebbal where it was first noticed.

Annual Report of the Agricultural Experiment Stations, Florida, for the year ending June 30, 1960.—364 pp., 29 fig., 1 diag., 5 graphs, [1961].

Some of the information has been noticed. In the report from the Plant Path. sect. (pp. 132–140) [cf. **40**, 148] C. W. Anderson states that the eggplant yellows str. of tobacco ring spot virus was not transmitted by a number of insects, including several aphid spp. Seed transmission in eggplant appeared to be nil or negligible. Some evidence of the presence of a 2nd virus disease of eggplant was obtained [cf. **39**, 373]. Natural infection of Hubbard squash by watermelon mosaic virus [**38**, 646] and of petunia by tobacco etch virus were discovered for the 1st time.

H. N. Miller reports a leaf spot of *Dieffenbachia* yielding *Cephalosporium* sp. [cf. **21**, 335], with initial infection of small yellow to reddish-brown circular lesions on young convolute leaves. Older spots may have concentric ring patterns. Infection of a stem rot disease of *Dracaena sanderiana* occurs through the basal end of tip cuttings before or during rooting. There is wilting and yellowing of the leaves and the lower part of the stem becomes blackened, water soaked and rotted. The causal organism is thought to be a new var. of *Aspergillus niger*, *A.n.* var. *floridanus* Miller [without a Latin diagnosis]. Control is obtained by dipping in ferbam before planting.

S. A. Ostazeski & P. Decker found that hot air treatments, effective in eradicating *Pleiochaeta setosa* from white lupin seed, failed to eradicate *Phomopsis leptostromiformis* [**40**, 311] from seed of yellow lupin even after readjusting moisture content of the seed from an original 9·5 to 11, 13, 15, and 17%.

Studies by H. H. Luke on the nature of reaction to *Helminthosporium* [*Cochliobolus*] *victoriae* in oats [**40**, 220] showed that at least 3 levels of susceptibility exist. Atlantic was the most tolerant while 2 selections (215, 227) were super susceptible. Victorgrain was intermediate and appeared to carry 2 levels of susceptibility well balanced within the population. Variation in reaction is thought to be due to 'background effect'.

T. E. Freeman notes that an application of N as low as 1 lb./1,000 sq. ft. significantly reduced the severity of dollar spot (*Sclerotinia homoeocarpa*) on Bermuda grass [*Cynodon dactylon*]. Grey leaf spot (*Piricularia grisea*) severity on St. Augustine grass [*Stenotaphrum secundatum*] was affected by N inversely to dollar spot, with a significant increase at rates over 2 lb./1,000 sq. ft. Control was conditioned more by repeated applications at 8-10 day intervals than by the fungicide used. The opt. temp. for infection of Bermuda grass by *H. stenospilum* was near 25° C. Actidione+thiram was outstanding in controlling *Helminthosporium* diseases of rye grass [*Lolium* sp.].

M. K. Corbett & D. A. Roberts purified potato virus X in an unaggregated state, using density-gradient centrifugation; over 50% of the particles had a normal length of 513 mμ. *Cassia occidentalis* is a satisfactory bioassay plant for this virus

and for tobacco ring spot virus, the particles of which appear to be icosahedrons, approx. 28 mμ across the parallel sides.

The bound amino acid patterns determined by T. E. Freeman & H. H. Luke in selections of St. Augustine grass resistant and susceptible to *P. grisea* and in oats resistant and susceptible to *Cochliobolus victoriae* were similar in resistant and susceptible, but the free amino acid content differed, the resistant grass containing more proline and the resistant oats significantly more arginine.

At the Citrus Sta. (pp. 194–241) W. C. Price & L. C. Knorr studied the movement of viruses in citrus. Seedlings were girdled to destroy phloem tissues in a 1 in. length of stem and then grafted with a virus-infected bud above or below; virus-infected buds were grafted into the stems of seedlings and removed intermittently; and infected buds were grafted on stems of 18 in. tall seedlings which were cut into sections after various periods and rooted. Neither tristeza nor psorosis viruses moved upward or downward through the girdled area, indicating normal passage in the phloem and not the xylem; the virus passed a graft union in 8–14 days, depending on environment and growth rate of seedlings; movement of virus in both directions was rapid once the union was passed; both viruses traversed 8 in. stem sections without infecting the section, suggesting movement as discrete particles, initially few in number.

M. Cohen found that the best treatment for melanose [*Diaporthe citri*] was spraying with 1·5 lb. tribasic Cu sulphate/100 gal. at petal fall and again 3 weeks later. Red Cu oxide at 1 lb./100 gal. and Cu-Zn-chromate at 2·7 lb. were also effective.

From the Sub-trop. Sta. (pp. 315–325) J. W. Strobel & R. A. Conover note that, apart from its presence in tomato, *Verticillium alboatrum* was found in fields of cowpea and okra [*Hibiscus esculentus*]. Weed hosts naturally infected were *Portulaca oleracea*, *Solanum gracile*, and *Hedeoma pulegioides*. Cantaloupe, watermelon, and eggplant were susceptible to inoculation and the fungus was recovered from symptomless inoculated plants of pole bean [*Phaseolus vulgaris*], pepper [*Capsicum*], sunflower, and soybean, but cabbage, cucumber, and squash were not infected by inoculation; 18 isolates, equally pathogenic to tomato, differed in rate of disease development.

L. A. McFadden reports a disease of *Syngonium podophyllum* characterized by water-soaked areas on the leaves, and apparently due to *Erwinia* sp. similar to that causing leaf rot of *Philodendron* [**39**, 660].

A leaf spot disease of *Schefflera actinophylla* caused by *Alternaria* sp. caused heavy plant losses in several nurseries.

Funder (S.). **Practical mycology. Manual for identification of fungi.**—144 pp., 211 fig., Oslo, Norway, Brøggers Boktr. A/S, 1961. $6.50.

A 2nd edition, slightly revised, of a work originally published in 1953 [**33**, 166].

Akhmedova (Mme N. B.) (Editor). Библиография изданий Академии Наук Казахской ССР **1932–1959.** [Bibliography of publications of the Academy of Sciences of the Kazakh S.S.R., 1932–59.]—1107 pp., Alma-Ata, Publishers of the Academy of Sciences of the Kazakh S.S.R., 1960.

In this compendium a large number of non-annotated bibliographical entries are arranged by subject. The section on microbiology and virology (pp. 397–410) contains many items of pathological interest, and that on floras (pp. 411–415) some of mycological interest.

Sasser (J. M.) & Jenkins (W. R.) (Editors). **Nematology. Fundamentals and recent advances with emphasis on plant parasitic and soil forms.**—xv+480 pp., illus., Chapel Hill, University of North Carolina Press, 1960. 100*s*.

This publication, compiled from a series of lectures and laboratory exercises pre-

sented during a Southern Regional Graduate Summer Session in nematology held at N. Carolina State College, 8–17 June 1959, deals with introductory matters, methodology, morphology and anatomy, selected groups, physiology and biochemistry, genetics and cytology, ecology, host-parasite relations, and control. Chapt. 40, by J. R. Christie (pp. 432–436), discusses interrelationships between nematodes and other soil-borne pathogens, including *Corynebacterium fascians* [cf. **38**, 218], associated with cauliflower disease of strawberry, *C. tritici* [cf. **26**, 446], associated with spike blight of wheat, and others. Chapt. 45, by C. L. Duddington (pp. 461–465), deals with biological control and predacious fungi [**36**, 773].

Spencer (J. F. T.) & Gorin (P. A. J.). **The occurrence in the host plant of physiologically active gums produced by Corynebacterium insidiosum and Corynebacterium sepedonicum.**—*Canad. J. Microbiol.*, **7**, 2, pp. 185–188, 1 pl., 1961.

At the Prairie Regional Lab., Saskatoon, shaken cultures of *C. insidiosum* and *C. sepedonicum* [cf. **40**, 124] produced viscous polysaccharide sols containing fucose, which was also hydrolysed from polysaccharides extracted from lucerne and potato plants infected with the respective bacteria, but not from healthy plants. Lucerne cuttings wilted rapidly in dilute polysaccharides. It is inferred that polysaccharides, formed probably in the vascular systems of the infected plants, may play a part in the development of the disease.

Fungicides.—*Res. Rep. Pest. Res. Inst., London, Ont., 1957–1960*, pp. 11–16, 1961.

This report [cf. **36**, 453] presents further information on the oxidation products of the dithiocarbamates and related compounds. In the presence of *Glomerella cingulata* spores thiram was decomposed in 30 min.—several days, the time depending on the conc. of the spores and thiram. This phenomenon was investigated. *S*-alkyl-2,5-dimercapto-1,3,4-thiadiazoles were regarded as unsafe, owing to their phytotoxicity, for use as agricultural fungicides. The alkyl-substituted cyclohexenones also were more phytotoxic than fungicidal. Acrolein phenylhydrazone was demonstrated to exert only a delaying action. The antifungal effectiveness of methyl bromide was shown to depend on the atmospheric vapour pressure and to be independent of temp. [**38**, 390]. Maleic hydrazide and heptachlor increased the severity of infection of barley seedlings by *Helminthosporium sativum* [*Cochliobolus sativus*] whereas 8 other insecticide and herbicide compounds reduced it [cf. **39**, 521]. Lindane, 2,4-D, and isodrin increased *Alternaria solani* lesions on tomato, whereas 9 of the compounds, including maleic hydrazide, decreased it. Lindane, isodrin, and dalapon increased tomato wilt (*Fusarium oxysporum* f. [*bulbigenum* var.] *lycopersici*), whereas the other compounds decreased it. Only dinoseb was toxic *in vitro* to the fungi.

Eradication of *Corynebacterium sepedonicum* from contaminated jute potato bags by fumigants and by heat [**40**, 244] was not successful because of the difficulty of penetration.

Code of practice for ground spraying.—5 pp., London, Ministry of Agriculture, Fisheries and Food, 1961.

An instruction leaflet on the use and maintenance of spraying machines, field procedure, and the hazards associated with the use of chemicals.

Georgopoulos (S. G.) & Thanasoulopoulos (C. C.). **Research on the control of Sclerotium rolfsii Sacc. with fungicides.**—*Ann. Inst. phytopath. Benaki*, N.S., **3**, 2, pp. 65–78, 4 fig., 1960. [22 ref.]

S. rolfsii [cf. **34**, 706] was isolated at the Phytopath. Sta., Patras, Greece, from young olive trees, sesame, and young vine plants. Semesan, cryptonol, and tuzet

killed sclerotia completely at concs. above 0·05, 0·02, and 0·1%, respectively, *in vitro*, while terraclor 75 W.P. and orthocide 50 did not prevent germination but retarded growth considerably. Semesan did not kill sclerotia or mycelium in infected stem tissue buried in soil but prevented growth and generally killed mycelium when used as a drench [cf. **38**, 390]; other chemicals, excepting formalin, were less effective. As dry dusts mixed with the soil only tuzet killed sclerotia. Terraclor 75 W.P. was most effective in retarding growth, followed by tuzet and orthocide 50. In field tests for the control of southern blight of tomatoes [cf. **39**. 154] in inoculated soil terraclor 75 W.P. and semesan were highly effective when applied around the base of the stem. On potato dextrose agar containing 0·02% terraclor 75 W.P. a terraclor resistant str. developed from the parent isolate used in all tests.

GREENE (G. L.). **An improved technique for testing effects of soluble postharvest fungicides on spore germination.**—*Plant Dis. Reptr*, **45**, 5, pp. 390–391, 1 fig., 1961.

An improvement on the centrifuge method of McCallan *et al.* [**22**, 146] is described from the Vining C. Dunlap Labs., United Fruit Co., La Lima, Honduras. The conc. of spores is adjusted so that the desired number ml. will be exposed to the fungicide when drawn into a 10-ml. syringe with a metal, locking-type tip, on which is then placed a Swinny hypodermic adaptor (Millipore Filter Corp., Bedford, Mass.) holding a filter disk. A 1·2 μ size of disk serves for most spores and gives an adequate liquid flow rate. After the liquid has been expelled the tip is placed on a 2nd syringe containing wash water, which is expelled through the filter disk on which the spores rest. The adaptor may be transferred to other syringes for further washings if necessary. Finally a known vol. of fresh water is drawn into the syringe and drops are expelled on to glass slides for incubation at the opt. temp. for germination.

The rapidity of the method reduced the time required for a large number of determinations of killing time and opt. conc. for a variety of different compounds.

JOSHI (K. C.). **Search for new organic fungicides.**—*Indian J. appl. Chem.*, **23**, 3, pp. 127–130, 1960.

The results of a study at the Chemistry Dept, Univ. Gorakhpur, India, on the fungicidal action of 25 compounds on 10-day-old cultures of *Aspergillus niger* are summarized and tabulated. The naturally weak activity of the 8 substituted benzoic acids was increased to some extent by halogenation and nitration, but on the whole they were only slightly effective.

The 11 substituted hydrazides and aromatic acids, on the contrary, were highly toxic, especially the derivatives of crotonic, sorbic, and $\alpha\beta$-hexenic acids. Inhibition was greatest with 2 derivatives of sorbic acid which gave av. of 74·2 and 77·1, 34·2 and 42·8, and 14·2 and 25·7 at concs. of 1:10,000, 1:100,000, and 1:1,000,000, respectively [cf. **38**, 303].

Of the 6 substituted phenylacetic acids and their esters, the most active were 2:4-dinitro-6-bromo and 2:6-dinitro-4-bromo, causing 61·5 and 53·7% inhibition, respectively, at 1:10,000. Conversion into esters reduced toxicity in this group.

SIDHU (G. S.), SATTUR (P. B.), & HASAN (SALMA J.). **Synthesis and fungicidal activity of some arylnitroalkenes.**—*J. sci. industr. Res.*, **19** C, 2, pp. 38–39, 1960.

At the Regional Res. Lab., Hyderabad, India, 2-iodo-3-methoxy- and 2-nitro-4-methyl-β-nitrostyrenes were toxic to *Aspergillus niger* on Sabouraud's medium (pH 6–7) at 30–35° C. at 1:100,000 acetone solution.

Karczewski (B.). **Nowe kierunki postępu techniki ochrony roślin.** [New trends of technical progress in plant protection.]—*Biul. Inst. Ochr. Rośl., Poznań, 1960*, 10, pp. 129–153, 17 fig., 1960. [Russ., Engl. summ. 30 ref. Cyclostyled.]

In this paper, read at the Session of the Committee of Plant Prot., Polish Acad. Sci., in Nov. 1958, the author discusses the best utilization of pesticides in view of the proportionately heavy wt. of the carriers and diluents. The methods of spraying, which is generally preferred to dusting, are classified according to the size of droplets, aerosols being given particular attention. The importance of a universal sprayer to produce droplets of any required size is emphasized. Various types of spraying machinery, including aircraft, are described and discussed in relation to these views.

Leinbach (L.) & Brekke (J. E.). **Fungicide residues. A modified Gibbs method for the determination of 1 p.p.m. or less of *o*-phenylphenol in fruits.**—*J. agric. Fd Chem.*, **9**, 3, pp. 205–206, 1 diag., 1961.

Interfering substances in fruits are stated to complicate the determination of trace amounts of the compound. At the W. Regional Res. Lab., Albany, Calif., recoveries of 85% or more were obtainable at the 1 p.p.m. level of the fungicide. The method proved applicable to strawberries, raspberries (fruits and purées), purées of prune, boysenberry, and fig, and orange juice.

Murphy (Elizabeth F.), Briant (Alice M.), Dodds (Mary L.), Fagerson (I. S.), Kirkpatrick (Mary E.), & Wiley (R. C.). **Effect of insecticides and fungicides on the flavor quality of fruits and vegetables.**—*J. agric. Fd Chem.*, **9**, 3, pp. 214–223, 1 fig., 1961.

From 1955–60 7 experiment stations and the Bureau of Human Nutrition, U.S. Dept Agric., co-operated in this project, which included 66 tests on 11 fungicides and 118 on 11 fungicide-insecticide combinations.

With Bordeaux mixture, tribasic Cu, and zineb on potatoes, flavour was not impaired but was, in fact, sometimes improved. On the other hand, with terrachlor (in only 1 crop yr.) 5 of the samples were adjudged to be off-flavour and 6 below standard. Of 14 combined treatments involving captan and thiram that gave 14 below-standard samples, 6 were combined with malathion and 5 with sevin. No ill effects were produced by captan and crag 341 on apples. No particular pesticide or combination is either recommended or rejected by the committee on the basis of these trials.

Nangniot (P.). **La polarographie appliquée au dosage de petites quantités de fongicides ou d'insecticides en dépôts ou en résidus sur plantes cultivées. I. Le dosage polarographique du soufre élémentaire résiduaire. II. Les dérivés de l'acide dithiocarbamique. 1. Le dimethyldithiocarbamate de zinc (ziram). 2. Le dimethyldithiocarbamate ferrique (ferbam). 3. L'éthylène-bisdithiocarbamate de zinc (zineb).** [Polarography applied to the dosage of small amounts of fungicides or insecticides as deposits or residues on cultivated plants. I. The polarographic dosage of residual elemental sulphur. II. The derivatives of dithiocarbamic acid. 1. Zinc dimethyldithiocarbamate (ziram). 2. Ferric dimethyldithiocarbamate (ferbam). 3. Zinc ethylene-bisdithiocarbamate (zineb).]—*Bull. Inst. agron. Gembloux*, **28**, 3, pp. 276–286, 1 diag.; 4, pp. 365–372, 2 graphs; pp. 373–380, 1 graph, 1 diag.; pp. 381–388, 2 graphs, 1 diag., 1960.

The determination of residual S on plants is effected readily and accurately by the polarographic method. Its use with ziram, ferbam, and zineb is fully described.

Rayner (R. W.). **Measurement of fungicidal effects in field trials.**—*Nature, Lond.*, **190**, 4773, pp. 328–330, 2 graphs, 1961.

The methods used are described (from Commonwealth mycol. Inst., Kew), taking as a basis experiments with coffee rust (*Hemileia vastatrix*) [cf. **40**, 169] at the Coffee Res. Sta., Ruiru, Kenya. The percentage of infected leaves/bush varied directly with foliage density later in the year and with the logarithm of the number of lesions/leaf. Strong correlation between rust levels on sub-plots indicated marked localization of the disease, suggesting a design in which alternate trees in the plots were left unsprayed and were assessed for rust incidence. Covariance analysis gave approximate adjustment for the effect on sprayed trees of rust level on unsprayed trees, but the analysis of the former expressed as a percentage of the latter was preferable. The advantages of this method in detecting treatment effects are outlined.

Kharchenko (S. M.). Антибіотичні властивості видів секції **Monoverticillata** роду **Penicillium,** вилучених з ризосфери сільськогосподарських рослин України. Повідомлення III. Вплив видів секції **Monoverticillata** роду **Penicillium** на проростання насіння Капусти та деякі бактеріальні захворювання рослин. [The antibiotic properties of species in the Monoverticillata sect. of *Penicillium* isolated from the rhizosphere of agricultural plants in the Ukraine. Report III. The effect of species in the Monoverticillata sect. of *P.* on Cabbage seed germination and some bacterial plant diseases.] —*J. Microbiol., Kiev*, **23**, 1, pp. 46–50, 4 fig., 1961. [Russ. summ.]

In further studies [cf. **40**, 339] at the Inst. Microbiol., Ukr. Acad. Sci., cultural liquids of *P. multicolor*, *P. bilai*, and *P. terlicowskii* stimulated seed germination and growth of cabbage. When seed was inoculated with *Erwinia carotovora*, and tomato seedlings with *Bacterium* [*Agrobacterium*] *tumefaciens*, the 10-day culture filtrate of *P. bilai* 134 inhibited the diseases.

Nederlandse namen van planteziekten bij fruitgewassen. [Dutch names for plant diseases of fruit.]—12 pp., 's-Gravenhage, Nederlands Normalisatie-instituut, 1959.

In this useful list (NEN 3017), prepared by the Nederlandse Planteziektenkundige Vereniging, under the alphabetically arranged Dutch names of the hosts, the names of the pathogens or other causes are given opposite the popular disease names.

Verona (O.), Treggi (G.), & Gambogi (P.) (Editors). **Schede fitopatologiche.** [Phytopathological notes.]—44 pp. (papers paged separately), 1 fig., Pisa, Osservatorio per le Malattie delle Piante, [1961].

Reprints of 10 papers, originally published in *Agricoltura ital.*, *1960*, giving useful accounts in popular terms of the history, geographical distribution (in some cases), causal organism, symptoms, and control of and damage caused by oak mildew (*Microsphaera alphitoides*) [cf. **35**, 91]; soft rot of celery, potato, carrot, and other hosts (*Erwinia carotovora*); bean [*Phaseolus vulgaris*] anthracnose (*Colletotrichum lindemuthianum*); spinach mould (*Peronospora effusa*) [**8**, 626]; peach leaf curl (*Taphrina deformans*) [**39**, 330, 598], also reported to occur in Sweden and Finland [map 58]; pine blister rust (*Cronartium asclepiadeum*) [cf. **39**, 636]; poplar canker (*Dothichiza populea*); *Cylindrosporium padi* [*Higginsia hiemalis*: **39**, 425] on cherry; *Phytophthora cactorum* on various hosts; and tobacco blue mould (*Peronospora tabacina*) [**40**, 324].

Šebek (S.). **Určování a popis barev v mykologii.** [Determination and description of colours in mycology.] —*C.C.H. mykol. Sborn.*, **38**, 3–4, pp. 44–45, 1961.

A note advocating accuracy of indication of colours and the use of a uniform

nomenclature [cf. **23**, 150]. The systems suggested by J. Paclt, *Farbenbestimmung in der Biologie*, Jena, VEB G. Fischer Verlag, 1958, and by E. B. Rabkin, *Atlas tsvetov*, Moscow, Medgiz, 1956, are recommended and reviewed.

Climatic and durability testing of service electronic components. Paper, jointing.—*Def. Spec. Min. Def.* DEF-5011, 37 pp., 2 fig., 2 graphs, 1960; DEF-113, 6 pp., 1 fig., 1961. 6*s*.; 2*s*.

Recommended basic climatic and mechanical robustness testing procedure for components for electronic equipment. Test J: mould growth.—*Publ. int. electrotech. Comm. Geneva*, 68–2, 5 pp., 1960. [Fr. version.]

The 1st two papers (publ. by H.M. Stationery Office, London) are followed by Appendix No. 6 (p. 32), dealing with the preparation of mould suspensions and control specimens and the storage of fungus cultures, and Appendix VII (p. 6) giving the standard method of determining resistance to mould growth, with a list of the fungi used in the test. The 3rd paper (2nd edition) also describes the standard test for resistance to mould growth and the method of preparing the spore suspension.

Hall (A. J.). **Resins for the protection of textile materials against attack by micro-organisms.** –*Text. Rec.*, **78**, pp. 52–55, 1961. [Abs. in *Amer. Dyest. Reptr*, **50**, 12, pp. 55–56, 1961.]

Results are given of soil-burial tests with cellulose goods [cf. **40**, 170] treated with various substances protecting against the cumulative action of different fungi and bacteria: attack is resisted by incorporating a fungicidal or fungistatic substance in the material or by treating the fibres so that they resist the breakdown activity of the micro-organisms and thus inhibit their normal growth. To the former group belong treatments of cotton with chlorinated phenolic substances (e.g. pentachlorophenol) and organo-metal compounds (e.g. Zn naphthenate and Cu-8-quinolinolate), which, however, are not permanent. Of protective treatments acetylation is effective but expensive, and the fabric is sensitive to saponification by alkalis. Cyano-ethylation of cotton is said to confer immunity at 11·4% combined N content for 13-day burial. Phosphorylated cotton obtained by treatment with urea and phosphoric acid has good resistance to mildew if combined P is at least 3%. Of resin treatments, Ciba's arigal process consists in impregnation of cotton with trimethylolmelamine, formic acid diacetine, and a non-ionic wetting agent; during drying the resin polymerizes and becomes fixed within the cotton fibre. The use of an acid colloidal sol. of trimethylolmelamine in 20% formic acid is recommended by the Southern Regional Res. Lab.; cotton cloth padded in this sol., dried, and cured at 140° C. is said to be protected for at least 21-weeks' burial.

Volkova (Mme L. P.). О применении нистатина в борьбе с плесневением мяса. [On the use of nystatin for the control of mould in meat.]—*Microbiology, Moscow*, **30**, 1, pp. 158–164, 3 fig., 1961. [Engl. summ.]

In 1959 at the All-Union sci. Res. Inst. for the Meat Industry 16 preparations (5 antibiotics) were tested for their efficacy against moulds on meat by determining their action against cultures of *Mucor*, *Aspergillus*, and *Penicillium*. K-25, sorbic acid, and nystatin [mycostatin] were then tested on meat.

Mycostatin (250 mg./l.) [cf. **40**, 317] combined with chlorotetracycline (100 mg./l.) when tested on slices and cuts of meat in the cold chamber inhibited moulding for 5–7 days and considerably slowed down the further spread of initial mould at 0·2, 3–5, and 5–7° [C.] and 75–95% R.H. Similarly, [unspecified] yeasts appeared 5–7 days later than on meat treated with chlorotetracycline alone, individual colonies being formed which scarcely increased in size and number. Treatment with mycostatin+chlorotetracycline increases meat preservation by 9–10 days longer than

untreated. The results obtained with aqueous and 10% aqueous-alcohol solutions of mycostatin were similar.

KRYUGER (L. V.). Эндотрофная микориза травянистых растений некоторых фитоценозов центрального Предуралья. [The endotrophic mycorrhiza of herbaceous plants of some phytocoenoses of the central Pre-Urals.]—*Bot. Zh. S.S.S.R.*, **46**, 5, pp. 617–627, 7 fig., 1961. [Engl. summ.]

In a study by the Perm agric. Inst. during 1953–57, mostly in the river Kama valley, Krasnokamsk area, endotrophic mycorrhiza of the phycomycete (thamniscophagous) type were found in 171 spp., ecto-endotrophic or endotrophic tolypophagous mycorrhiza in 10 spp., and none in the remaining 87 examined. In meadow associations at different stages of turf formation the rhizome, rhizome-loose-tussock, and loose-tussock plants were mycorrhizal as well as the compact-tussock or turf-forming plants.

BORROW (A.), JEFFERYS (E. G.), KESSELL (R. H. J.), LLOYD (EITHNE C.), LLOYD (P. B.), & NIXON (I. S.). **The metabolism of Gibberella fujikuroi in stirred culture.**—*Canad. J. Microbiol.*, **7**, 2, pp. 227–276, 1 pl. (4 fig.), 7 fig., 35 graphs, 1961. [61 ref.]

A study report by the Imperial chem. Industries Ltd., Welwyn, Herts., on the growth of the fungus in different media, comprising a description of materials and equipment, an account of experiments, and analysis of results. Four phases of growth are defined, relating to the changing nutrient status of the fungus.

ZWEIG (G.) & DEVAY (J. E.). **On the biosynthesis of gibberellins from carbon-14-substrates by Fusarium moniliforme.**—*Mycologia*, **51** (*1959*), 6, pp. 877–886, 1961.

An account of studies at Univ. Calif., Davis, to elucidate the biosynthetic pathway of gibberellic acid by *Gibberella fujikuroi* [cf. **38**, 670 and above] by growing the fungus on various substrates containing C-14. A practical method was also devised of synthesizing randomly labelled gibberellic acid-C 14.

CARTER (J. F.) & DICKSON (J. G.). **Sporulation of Pyrenophora bromi in culture.**—*Phytopathology*, **51**, 3, pp. 204–206, 1 fig., 1961.

At Dept Agron., N. Dak. State Univ., Fargo, a satisfactory medium for *P. bromi* [**39**, 590] was composed of 100 g. soybean oil-meal, 17 g. agar, 1 l. water. Conidial production was best at 12–16° C. with diurnal light and dark. Perithecial formation was max. at 16° in the dark or with diurnal light.

GIRBARDT (M.). **Licht- und elektronenmikroskopische Untersuchungen an Polystictus versicolor. V. Zur Frage der Kernfärbung mit Eisen-Hämatoxylin.** [Light- and electron-microscopic investigations on *P. versicolor*. V. On the question of nuclear staining with Fe-haematoxylin.]—*Flora*, **150**, 2–3, pp. 427–440, 19 fig., 1961. [25 ref.]

Further work [**40**, 85] showed that staining of the interphasal nucleus depends on the nature of the fixative. In tests with 40 of these the nucleus and nucleolus were stainable after the action of chrome-osmium compounds, while acetic acid prevented staining of the outer nucleus. The effects of sublimate, formol, and bichromate in fixatives and results with 14 other fungi are discussed.

HEINEMANN (P.) & CASIMIR (J.). **Distribution des acides aminés libres dans le genre Agaricus Fr. sensu stricto (= Psalliota).** [Distribution of free amino-acids in the genus *Agaricus* s. str. (= *Psalliota*).] –*Rev. Mycol., Paris*, **26**, 1, pp. 24–33, 2 fig., 1961. [Engl. summ. 14 ref.]

Studies at the Inst. agron. de l'État, Gembloux, Belgium, showed that *Agaricus*

spp. are rich in free amino-acids. One, the γ-(p-hydroxy) anilide of glutamic acid, present in mushrooms is virtually exclusive to the genus, and a relationship was observed between its conc. and the classification of the genus. The hypothesis is put forward that this acid is responsible for the reddening of the flesh, spore colour resulting from its oxidation products. On the whole, the distribution of free amino-acids agrees well with the present classification of the genus.

Mirocha (C. J.) & Devay (J. E.). **A rapid gas chromatographic method for determining fumaric acid in fungus cultures and diseased plant tissues.**—*Phytopathology*, **51**, 5, pp. 274–276, 3 graphs, 1961.

A more detailed account, from Univ. Calif., Davis, of work on *Rhizopus* spp. from almond [**40**, 178].

Pasinetti (A.), Pasinetti (L.), & Polettini (C. A.). **Processi gommotici sperimentali nei vegetali. L'azione dell' acetato di uranile sui tessuti vegetali parenchimatici e meristematici. Esami anatomo e istopatologici. (Nota II).** [Experimental gummosis processes in plants. The action of uranium acetate on parenchymatous and meristematic plant tissues. Anatomical and histopathological studies. (Note II).]

Pasinetti (A.) & Vezzoni (A.). **Esami radiobiologici e radiochimici. (Nota III).** [Radiobiological and radiochemical studies. (Note III).]

Pasinetti (A.) & Pasinetti (L.). **L'azione dell' acetato di piombo sui tessuti parenchimatici e meristematici. Esami anatomo ed istologici. (Nota IV).** [The action of lead acetate on parenchymatous and meristematic tissues. Anatomical and histological studies. (Note IV).]

Marino (O.). **Carenza ed eccesso di alcuni elementi nutritivi quali cause dell' ipotrofia, atrofia, ed ipertrofia radicale. (Nota V).** [Deficiency and excess of some nutrient elements as causes of root hypotrophy, atrophy, and hypertrophy. (Note V).]

Polettini (C. A.). **Effetto dell' eccesso di azoto e della deficienza di azoto e calcio su Phaseolus vulgaris L. (Nota VI).** [Effect of excess nitrogen and of nitrogen and calcium deficiency on *P. vulgaris*. (Note VI).]—*Ann. Fitopat.*, **4**, 3–4, pp. 79–106, 9 pl. (17 fig.): pp. 107–121, 3 pl., 1 graph, 1959. 5–6, pp. 133–148, 9 pl. (17 fig.): pp. 161–172, 173–179, 1960. [Fr., Engl. summ. 42, 8, 9 ref.; Fr. summ. 9 ref.; Engl. summ. 10 ref.]

These studies are described in detail. Note II deals with the effects of uranium acetate on *Cicer arietinum*, *Phaseolus vulgaris*, wheat, and maize, Note III describes its effects on the parenchymatic and meristematic tissues of *P. vulgaris* and *C. arietinum* and gives an account of an investigation of the absorption and circulation of radiophosphate P^{32} and of the resultant distribution of radio-activity in the plants. Note IV discusses the effect of Pb acetate on all 4 plants; V details the effects of N and P on the roots of young wheat plants; and VI the development of gummosis in *P. vulgaris*.

Ritchie (D.). **Spiral growth of fungus colonies.**—*Growth*, **24**, 4, pp. 391–400, 6 fig., 1960.

This pattern of growth occurred in cultures of *Aspergillus ustus* isolated at Dept Bot., Columbia Univ., N.Y., from a sample of decaying cloth in New Guinea, in *Phoma* sp. from rotting wood in salt water near Long Island, *Curvularia* sp. from sea water in Delaware Bay, and *C. inseminata* off Long Island. From the point of inoculation the hyphae grew in a counter-clockwise direction, thus giving the colony a whirled appearance. The curvature was not constantly present, but was promoted or inhibited by unknown genetic and environmental factors. In *A. ustus*

the variation was most conspicuous in cultures on Czapek's agar, which stimulates vigorous growth.

Seidel (Helga). **Untersuchungen über den Nährstoffbedarf und die Toxinbildung des Pilzes Phytophthora infestans (Mont.) de Bary in vollsynthetischen Nährlösungen.** [Studies on nutrient requirement and toxin formation of the fungus *P. infestans* in fully synthetic nutrient solutions.]—*Phytopath. Z.*, **41**, 1, pp. 1–26, 1 fig., 3 graphs, 1961. [Engl. summ. 79 ref.]

At the Inst. für allgemeine Botanik, Friedrich Schiller Univ., Jena, Germany, it was found that NH_4 and tartrate were the essential factors in the nutrient solution F3 [**18**, 335] for successful growth [**38**, 447]. Of 5 sugars tested, only sucrose proved as good as glucose, growth with the latter being promoted during 6 weeks more by succinic acid than by tartrate. In culture filtrates from solutions F3 and F3B after 2–12 weeks the greatest toxic activity occurred in the 5th week. Of the 2 potato vars. tested Leona was more sensitive than Erstling. Boiling the filtrates led to a marked reduction of toxicity only in certain instances. Part of the toxic substance or substances could be removed by alcohol precipitation; when dissolved again in distilled water the precipitate produced the same symptoms as the culture filtrates on test plants, though not to the same degree.

Winstead (N. N.) & McCombs (C. L.). **Pectinolytic and cellulolytic enzyme production by Pythium aphanidermatum.**—*Phytopathology*, **51**, 5, pp. 270–273, 1961. [27 ref.]

In further studies at N. Carol. State Coll., Raleigh [cf. **40**, 198], *P. aphanidermatum* [**40**, 285] from cucumber produced both types of enzyme *in vitro* and *in vivo*. A depolymerase or endopolygalacturonase in the culture filtrates degraded Na polypectate but did not render citrus pectin sols. less viscous. Pectinmethylesterase (PME), though not produced in culture, was present in filtrates from diseased fruits, which reduced the viscosity of pectin and Na polypectate sols. without hydrolysis to galacturonic acid. PME from healthy cucumbers failed to degrade the 2 pectin substrates. Culture filtrates and extracts of inoculated cucumbers contained a partially heat stable Cx type cellulolytic enzyme that reduced the viscosity of carboxymethylcellulose but did not hydrolyse this to cellobiose. Cellobiose was degraded to glucose. The activities of the enzymes produced are apparently correlated with the softening of cucumber fruits by *P. aphanidermatum*.

Morrison (R. M.). **A study of Erysiphe cichoracearum DC. ex Mérat on detached leaf culture.**—*Diss. Abstr.*, **21**, 9, pp. 2448–2449, 1961.

At Univ. Ind. the opt. temp. for maintenance of the leaf disk tissue of 3 spp. of host plants used and for the growth of *E. cichoracearum* [cf. **39**, 260; **40**, 264] was 18°–20° C. Both disks and mildew colonies did well in conditions of high R.H., though surface condensation on the disk prevented germination of the conidia and caused an established colony to cease growth. Illumination at 300–400 ft. candles favoured host tissue and parasite, 18 hr. light alternating with 6 hr. darkness. Light stimulated spore germination at low temps., the highest percentage occurring at 18–24°: there was little below 10° and none at 32°.

On leaf disks 44 clonal isolates from sunflower, *Xanthium pennsylvanicum*, and *Zinnia elegans* failed to produce cleistothecia, though intercrosses between them did so in 3–5 weeks, ascospores developing in 6–7 weeks. With several exceptions, the isolates were interfertile, the exceptions suggesting that there are 2 allelomorphic series controlling compatibility and host specificity. All the clones grew on sunflower tissue: the *Z. elegans* clones did poorly on *X. pennsylvanicum* tissue and the *X. pennsylvanicum* clones on *Z. elegans* tissue.

Neelakantan (V.) & Mehta (B. V.). **Studies on copper deficiency and toxicity symptoms in some common crops of Gujarat (India).**—*J. agric. Sci.*, **56**, 3, pp. 293–298, 1961. [25 ref.]

In further work at Inst. Agric., Anand [**39**, 90; **40**, 87], symptoms were studied in guar (*Cyamopsis psoralioides*), bottle gourd (*Lagenaria leucantha*), eggplant, and blue panic grass (*Panicum antidotale*) in sand culture at 7 Cu levels from 0–10 p.p.m. The visual deficiency symptoms in guar were marginal curling and drying of the young leaves, chlorosis of the leaflets, and necrotic spotting; in bottle gourd loss of turgidity and drooping of the lower leaves, followed by chlorosis and drying of leaves; in eggplant faint green colour of the leaves, chlorosis of the margin of the older leaves, white necrotic spots, and leaf scorch; and in panic grass yellowish-green leaves, brownish-white spots, and depressed growth.

Toxicity symptoms in guar were stunting, drying of the lower leaves, and formation of only a few seedless pods; in bottle gourd chlorosis of lower leaves and marked stunting; in eggplant dull green, chlorotic leaves; and in panic grass stunting, leaf chlorosis, and a scorched appearance of the plant.

Peterson (N. K.) & Purvis (E. R.). **Development of molybdenum deficiency symptoms in certain crop plants.**—*Proc. Soil Sci. Soc. Amer.*, **25**, 2, pp. 111–117, 14 fig., 1961.

Descriptions and results are given of lab. experiments at the Soils Dept agric. Exp. Sta., Rutgers Univ., New Brunswick, N.J. [cf. **40**, 55] with broccoli, cauliflower, tobacco, maize, cotton, and soybean.

Augier (J.). **Problèmes et méthodes en microbiologie du sol.** [Problems and methods in soil microbiology.]—*Ann. sci. Univ. Besançon*, Sér. 2, **3** (*1959*), pp. 51–67, 4 graphs, 1960.

The author discusses the subject from the points of view of ecological factors and methods, including those employing liquid media; the ecological and dilution methods are compared; and the relationship investigated between the number of micro-organisms exerting a definite action and the energy cycle in relation to the C and N cycles.

Gams (W.). **Une nouvelle méthode d'isolement des champignons du sol.** [A new method of isolating fungi from the soil.]—*Ann. sci. Univ. Besançon*, Sér. 2, **3** (*1959*), pp. 93–94, 1 fig., 1960.

A brief account of a method already noticed [**39**, 390].

Herr (L. J.), Weaver (C. R.), & Horst (R. K.). **A soil dilution procedure applicable to rhizosphere micro-organism assays.**—*Canad. J. Microbiol.*, **7**, 2, pp. 277–280, 1 graph, 1961.

A description from Ohio agric. Exp. Sta., Wooster, of a procedure for accurate determination of soil sample wts. Suspended soil wts. can be collated with the wts. of soil in the original suspensions (added soil wts.); the relation between them was expressed mathematically to show the differences (due to imperfect suspension), which related in turn to the differences in the quantity of micro-organisms. For counts of the latter, based on both the suspended and added soil wts., Lochhead's formula [cf. Johnson *et al.*, **39**, 553] was used, employing a 1:250,000 dilution, to determine total actinomycetes and bacteria, and a triple-agar-layer plate technique [cf. **38**, 673], employing a 1:50,000 dilution/plate, to assay actinomycetes antagonistic to *Fusarium roseum*.

Moreau (R.). **À propos de l'échantillonnage des terres.** [On soil sampling.]—*Ann. sci. Univ. Besançon*, Sér. 2, **3** (*1959*), pp. 79–83, 1960.

From a review of the results obtained recently by 3 workers (*Pédologie*, **7**, pp. 5–13,

98–105, 1957) the author concludes that variations in the soil microflora (mostly bacteria and actinomycetes) with the seasons relate also to the type of soil, vegetation, etc. Variation in total microflora due to seasonal influences is less marked than that due to differences in site; one worker, for example, found a difference of over 200 million organisms between 2 partial samples from a single field, though for 2 soil types studied the differences due to spring and autumn did not exceed 100 million. In practice, the date of the collection is essential and samples should be taken in both spring and autumn.

Parkinson (D.) & Moreau (R.). **Les méthodes d'étude des champignons dans la rhizosphère.** [Methods of studying the fungi in the rhizosphere.]—*Ann. sci. Univ. Besançon*, Sér. 2, **3** (*1959*), pp. 85–92, 1960. [58 ref.]

A summary, based on the literature [cf. **39**, 553; **40**, 86]. Experimental study of the rhizosphere and isolation of fungi from root surfaces are briefly touched on.

Parkinson (D.) & Williams (S. T.). **A method for isolating fungi from soil microhabitats.**—*Plant & Soil*, **13**, 4, pp. 347–355, 1 fig., 2 graphs, 1961.

This technique, developed at Univ. Liverpool, allows the isolation of fungi from washed soil particles of known sizes [cf. **10**, 257; **28**, 240]. Sterile water (150 ml.) is run into a perspex box (18×6×6 cm.) fitted with steel sieves in descending order of mesh size from top to bottom; soil is placed on the top sieve. Sterile air is pumped in from below to produce vigorous agitation, and after washing has continued for the desired time, the pump is stopped and the water drained out. The water from selected washings is bottled and centrifuged. One-ml. samples of the supernatant water are incorporated with cooled, molten agar—yeast extract adjusted to pH 5, and after incubation the numbers of fungal and bacterial colonies are recorded [cf. **35**, 34]. With the soil used (a garden soil from Cheshire) 25–30 washings were required to remove most of the spores. The procedure for isolating fungi from a cultivated soil is detailed.

Parkinson (D.) & Clarke (J. H.). **Fungi associated with the seedling roots of Allium porrum L.**—*Plant & Soil*, **13**, 4, pp. 384–390, 1961.

Analyses at Univ. Liverpool of washed root pieces [**35**, 34] of Musselburgh leek seedlings grown in glasshouse conditions in 3 different cultivated soils from Wirral, Cheshire, showed that the roots supported a typical root-surface mycoflora which was, however, sparser than that recorded for several other angiosperm roots. As suggested by Peterson [**37**, 762], soil pH influences the association of saprophytic fungi, especially *Cylindrocarpon*, *Fusarium*, *Mortierella*, and *Gliocladium* spp., with plant roots.

Moreau (R.). **Sur l'action antiphytotique et anti-bactérienne de l'humus de Sapinière.** [On the antiphytotic and antibacterial action of humus from *Abies alba* plantings.]—*Ann. sci. Univ. Besançon*, Sér. 2, **3** (*1959*), pp. 69–78, 1 graph, 1960.

An extract of humus from below *A. alba* > 200 yr. old in the Jura Mountains retarded germination of *Lepidium sativum* seeds and markedly reduced growth.

Media containing extracts from the humus and from the soil from a young beech planting both had a marked antagonistic action on the bacteria and actinomycetes in soil from young firs and regenerating beech, whether the extract was used cold or after autoclaving. Dilution of 1 in 5 (at least) seemed to have little effect, sometimes even increasing the antimicrobial action.

Gondo (M.) & Arimura (M.). **Soil-ecological studies on the soil-pathogens II. Relation between Helicobasidium mompa Tanaka and the other soil micro-**

organisms.—*Bull. Fac. Agric. Kagoshima Univ.* 8, pp. 70–75, 1 diag., 5 graphs, 1959. [Japanese. Abs. from Engl. summ.]

Further studies [**38**, 577] revealed that the opt. temp. for mycelial growth of *H. mompa* is 20–27° C., and that the fungus develops well at soil moisture contents above 60% (opt. 90%); opt. soil pH for mycelial growth is 6–7. The growth of actinomycetes is not influenced by soil pH and increases with time. Organic materials and Ca $(H_2PO_4)_2$ added to the soil helped the growth of all fungi tested, while $(NH_4)_2SO_4$ and K_2SO_4 appeared to be unfavourable to them. There seemed to be but little correlation between the growth of *H. mompa* and other non-pathogenic micro-organisms.

Zajic (J. E.) & Kuehn (H. H.). **Use of beta-ionone in enrichment cultures for isolating Paracolobactrum and certain fungi from soil.**—*Canad. J. Microbiol.*, **7**, 2, pp. 119–124, 1961.

At Res. Dept, Grain Processing Corp., Muscatine, Iowa, 0·2% β-ionone, an acyclic terpene, inhibited the growth of ca. 99% of the soil microflora. As with perfume oils containing terpenes, fungi were more sensitive than bacteria [cf. **38**, 185; **40**, 327]; for most fungi 0·8–1·6% was inhibitory. From soil samples plated on media +β-ionone *Fusarium* spp. and *Trichoderma viride* were isolated most often, and *Geotrichum candidum* and *Scopulariopsis brevicaulis* were isolated from specific soils. Suppression of the Mucorales suggests an easy means of excluding these fungi from plates in routine screening.

Kole (A. P.) & Gielink (A. J.). **Electron microscope observations on the flagella of the zoosporangial zoospores of Plasmodiophora brassicae and Spongospora subterranea.**—*Proc. Acad. Sci. Amst.*, Ser. C, **64**, 2, pp. 157–161, 7 fig., 1961. (*Meded. Lab. phytopath. Wageningen* 191).

In further studies at Wageningen [cf. **39**, 460] the zoosporangia of *P. brassicae* [**35**, 136] and *S. subterranea* [**33**, 556] were found to be distinct from each other in form, size, and arrangement in the host cell. In flagellation the zoospore of the former differs in that the shorter flagellum appears to lack the short end piece present in that of the latter.

Lowe (J. L.) & Gilbertson (R. L.). **Synopsis of the Polyporaceae of the Southeastern United States.**—*J. Elisha Mitchell sci. Soc.*, **77**, 1, pp. 43–61, 1961.

In this preliminary paper from Syracuse Univ., N.Y., based on taxonomic information at present available, 293 spp. and 7 vars. are considered to be valid elements of the flora. Keys to the genera and species are given. *Poria eyrei* and *P. latitans* are reported for the 1st time from N. America; *P. salmonicolor*, widely cited as a synonym of *P. spissa*, is regarded as a valid sp., antedating *P. rubens*.

Nelson (R. R.). **Evolution of sexuality and pathogenicity. II. A comparison of the pattern of sexuality in Cochliobolus victoriae and related species.**—*Phytopathology*, **51**, 4, pp. 222–223, 1961.

Further studies at N. Carol. State Coll., Raleigh [**40**, 30], showed that compatibility in *C. victoriae* [**40**, 210] is controlled by a single major gene locus. Of 537 single ascospore cultures, 264 belonged to group *A* and 273 to *a*. Frequently isolates failed to cross with others of known compatibility.

It is suggested that *C. heterostrophus*, *C. carbonum*, *C. sativus*, and *C. victoriae* possess some genes in common since they have similar compatibility and incompatibility mechanisms.

Schrantz (J. P.). **Recherches sur les Pyrénomycètes de l'ordre des Diatrypales, sensu M. Chadefaud, 1957.** [Researches on the Pyrenomycetes of the order

Diatrypales, sensu M. Chadefaud, 1957.] —*Bull. Soc. mycol. Fr.*, **76**, 4, pp. 305–407, 24 pl., 1960. [63 ref.]

An account of studies conducted to draw up this annotated list of families, genera, and species to be placed in the order, including the Hyponectriales, which, according to Chadefaud [**40**, 522], should not be separated from them.

Hiromoto (K.). **Culture of mycelia from the fruit body of Hymenomycetes by the 'hymenium-isolation method'.**—*Bot. Mag., Tokyo*, **74**, 873, pp. 154–159, 1961. [Jap. Abs. from Engl. summ.]

Tests with 19 hymenomycetes at the Kumage-Minami High School, Yamaguchi Prefecture, showed that isolation of the mycelium is most easily obtained from the hymenium, a suitable culture medium being pine-decoction agar [**40**, 208]; gills give better growth than tubes or spines, but all are superior to stipe and pileus flesh.

Richardson (L. T.). **A large culture plate for agar diffusion assays, seed treatment evaluation, and mass production of spores.**—*Canad. Pl. Dis. Surv.*, **41**, 3, pp. 169–170, 1961.

The components are a Pyrex dish ca. $9 \times 14 \times 2''$ and a $10 \times 15 \times \frac{1}{8}''$ piece of asbestos board (transite) clipped on as a cover. It takes as many samples as 12 Petri dishes.

Staffeldt (E. E.). **Observations on lyophil preservation and storage of Pythium species.**—*Phytopathology*, **51**, 4, p. 259, 1961.

In further viability tests with 18 *Pythium* cultures which had been lyophilized and stored for 5 yr. 11 months-7 yr. the results were similar to those of the 1953 assay [**33**, 745], except for 2 samples of *P. debaryanum* which failed to survive. The method is successful only with spp. producing oospores.

Varney (E. H.). **Vermiculite media for growing fungi.**—*Plant Dis. Reptr*, **45**, 5, p. 393, 1961.

Vermiculite saturated with a solution of nutrients (3:1) has been successfully used as a medium for fungi at Dept Plant Path., Rutgers Univ., N.J.

Viruses and research on plant diseases at the Institute.—Reprinted from *Rockefeller Inst. Quart.*, **4**, 2, 3 pp., 2 fig., 1960.

An interesting account in semi-popular terms of the research in plant pathology over a period of 3 generations which developed as a result of L. O. Kunkel's studies on tobacco mosaic virus.

Gudauskas (R. T.). **Plant viral infections as influenced by extracts from some known or suspected hosts of stone-fruit viruses.**—*Diss. Abstr.*, **21**, 6, pp. 1323–1324, 1960.

At Univ. Ill. extracts from mature leaves and roots of cherry and chokecherry (*Prunus virginiana*), from young and mature leaves of multiflora rose, and from mature leaves, stems, and roots of peach inhibited to varying degrees infection by tobacco mosaic virus on bean (*Phaseolus vulgaris*). Infection of cucumber cotyledons by known cherry ring spot virus in extracts from cucumber cotyledons was strongly inhibited (98%) by extracts from mature leaves of chokecherry, and slightly inhibited (9–15%) by extracts from mature leaves of cherry, peach, and multiflora rose. The properties of the inhibitors are described.

Resconich (E. C.). **Heat-induced susceptibility to Tobacco mosaic virus and thermal injury in Bean.**—*Virology*, **13**, 3, pp. 338–347, 2 fig., 4 graphs, 1961. [11 ref.]

At Univ. Notre Dame, Ind., supra-opt. hot water treatment (40–55° C.) for 1–10

sec. of bean (*Phaseolus vulgaris*) leaves before carborundum inoculations with the green aucuba str. of tobacco mosaic virus [cf. **36**, 294] induced more lesions, which were also larger [cf. **37**, 342] and appeared earlier, than in the controls.

THUNG (T. H.) & NOORDAM (D.). **Over het mechanisme van de infectie.** [On the mechanism of infection.]—*Meded. LandbHogesch. Gent*, **24**, 3–4 (*Meded. Lab. Virol., Wageningen*, 12), pp. 775–778, 1959. [Engl. summ.]

Some of this work has been noticed [**38**, 468]. Addition of clay minerals to the inoculum decreased infectivity of tobacco necrosis virus (TNV) but not that of tobacco mosaic virus (TMV). Dipping *Nicotiana glutinosa* leaves inoculated with TMV −carnation sap. or tobacco or *Phaseolus vulgaris* with TNV+sap, in a clay minerals suspension increased the number of local lesions by 10–45%, but dipping leaves inoculated with virus alone had no such effect [cf. loc. cit.]. The inhibitory sap seems to prevent multiplication of the virus but not its presence at multiplication sites.

It is suggested that the inhibitor may cause a reversible inactivation of virus nucleic acid (irreversible with ribonuclease [**38**, 337]), or it may prevent virus multiplication by changing specific processes in the cell.

SEMAL (J.). **Action de l'extrait de Begonia tuberhybrida sur le nombre de lésions locales formées par le virus de la mosaïque du Tabac et par quelques autres virus.** [Effect of the extract from *B. tuberhybrida* on the number of local lesions formed by TMV and other viruses.]—*Bull. Inst. agron. Gembloux*, **28**, 4, pp. 433–444, 3 graphs, 1960. [Engl. summ. 15 ref.]

Further studies [cf. **40**, 364] showed that sap from [healthy] *B. tuberhybrida* plants mixed with various plant viruses and rubbed on the leaves of different plants modified the number of local lesions, usually causing a marked decrease [cf. **40**, 290]. With TMV on *Nicotiana glutinosa* and *Phaseolus vulgaris* the decrease or increase was a function of the acid conc. of the extracts. The inhibitor was identified as oxalic acid: similar results were obtained with a mixture of oxalic acid and K oxalate.

The effect of the oxalic acid conc. on the rate of lesion formation was specific for the test plant. It is interpreted as the result of both an inhibition (caused by acidity) and an augmentation (caused by oxalic ions).

NENE (Y. L.). **Studies on the mechanism of inhibition of Tobacco mosaic viral infection by enzymes.**—*Diss. Abstr.*, **21**, 6, p. 1325, 1960.

At Univ. Ill. ribonuclease (RNase) inactivated by carboxymethylation, but not by hydrolysis or oxidation, inhibited infection of bean (*Phaseolus vulgaris*) leaves when applied by 'rubbing' after inoculation. On *Chenopodium amaranticolor* leaves inhibition was not as strong as on bean. RNase applied by 'dipping' 4 days before inoculation was partially inhibitory on bean, but not 7 days before; infection was completely inhibited by 'rubbing' RNase 7 days before. It was inhibitory when mixed with virus at pH 3·3 and when applied at pH 1·5 10 min. after inoculation, but was only partially so at pH 11·5. With RNase conc. varied, higher conc. inhibited more than lower, whereas with RNase conc. constant virus at higher conc. influenced inhibition only slightly. Carboxymethylated, hydrolysed, and oxidized RNases inhibited leaf infection when mixed with virus. On bean RNase was inhibitory when rubbed on 8 hr. after inoculation or when dipped up to 1 hr. after.

It is concluded that inhibition is not due either to an enzymatic degradation of RNA or to an alteration in physiological susceptibility of the host; but is attributed to an interference in the attachment of virus to host virus-receptors by the formation of a complex with them. Inhibition by steapsin and trypsin is due to an

interference in attachment of virus to virus-receptors by the formation of an enzyme-virus complex.

MACKINNON (J. P.). **Transmission of two viruses by aphids reared on different hosts.**—*Virology*, **13**, 3, pp. 372–373, 1961.

Though *Myzus persicae* cannot be maintained on *Physalis floridana* plants it can be kept on detached leaves. In further studies [**40**, 349] this method was used to rear colonies of the aphid, 3 on healthy *P. floridana* and *Datura stramonium* infected by potato leaf roll virus (LR), and 2 on the same spp. infected by turnip latent virus [*P. floridana* yellow net virus (YN)]. Those reared on *P. floridana* +LR were significantly better vectors of YN than those reared on healthy hosts or on *D. stramonium*+LR. Aphids reared on healthy *D. stramonium* were significantly more efficient vectors than those from rape. On the other hand, differences in the hosts on which aphids were reared or the presence of YN in them did not appear to affect subsequent acquisition and transmission of LR, aphids from *P. floridana* or *D. stramonium* being very efficient vectors of it.

When 50 aphids were fed on *D. stramonium* for 1 or 4 days before acquiring YN, they were not more efficient as vectors than controls fed only on rape.

It is concluded that not only should the host upon which the aphids are reared be considered when comparing vector efficiency for these viruses, but attention should also be given to the possible presence of unrelated viruses.

THOMSON (A. D.). **Interactions between plant viruses. I. Appearance of new strains after mixed infection with Potato virus X strains.** —*Virology*, **13**, 4, pp. 507–514, 2 fig., 1961.

At agric. Res. Council Virus Res. Unit, Cambridge [cf. **40**, 212], mixed infections with potato virus X strs. in pairs caused symptoms in *Nicotiana glutinosa* plants different from those produced by single strs. From mixed infections with strs. AST4 and 3XE-1 one or possibly 2 new strs. were isolated, the serological properties and host plant reactions of which were compared with those of the original strs. Attempts to select similar variants from plants infected by either str. alone were unsuccessful. It is concluded that the evidence is inadequate to prove that genetic recombination occurs between the virus X strs.

WITTMANN (H. G.) & PAUL (H. L.). **Vergleich der Aminosäurenzusammensetzung der Proteine des Echten Ackerbohnenmosaik-Virus, des Broad Bean mottle-Virus und des Tabakmosaik-Virus.** [Comparison of the amino acid composition of the proteins of Broad Bean true mosaic virus, Broad Bean mottle virus, and Tobacco mosaic virus.]—*Phytopath. Z.*, **41**, 1, pp. 74–78, 2 graphs, 1961.

Further studies at the Max Planck Inst., Tübingen, and the Inst. für landwirtschaftliche Virusforschung, Brunswick, Germany [**40**, 502], showed that the amino acid composition of the 2 broad bean viruses was entirely different and therefore they are not related as suggested [**35**, *Suppl.*, p. 10].

BOS (L.), HAGEDORN (D. J.), & QUANTZ (L.). **Suggested procedures for international identification of Legume viruses.**—*Tijdschr. PlZiekt.*, **66**, 6, pp. 328–343, 1 diag., 1960. [Germ., Dutch summ. 25 ref.]

The adoption of standardized procedures for the identification and description of legume viruses [cf. **39**, 450] is advocated by the authors (Inst. Phytopath. Res., Wageningen; Univ. Wis., Madison; and Biol. Bundesanstalt, Brunswick). They recommend differential hosts for the separation of virus complexes found in the field, a list of indicator hosts, standard abbreviations for symptoms, and a study of varietal reactions of pea and bean (*Phaseolus vulgaris*), suitable vars. being listed. Techniques for investigating physico-chemical properties are outlined, also those

for electron microscopy, serology, cross protection, and insect transmission; the importance of the first three is stressed. Most of the procedures are applicable to viruses in general.

Westdal (P. H.), Barrett (C. F.), & Richardson (H. P.). **The six-spotted leafhopper, Macrosteles fascifrons (Stål.), and Aster yellows in Manitoba.**—*Canad. J. Pl. Sci.*, **41**, 2, pp. 320–331, 10 graphs, 1961. [20 ref.]

In field collections (mostly cereals) by the Canada Dept Agric., Winnipeg, Man., the numbers of virus-carrying *M. fascifrons* [**40**, 1, 31, 316, and below] did not exceed 1%. Percentage transmission was highest in the migrant population but dropped in July and Aug. with the increase in local populations. The rate was low in June and July but reached a peak, in conjunction with max. population, in Aug., late maturing crops thus being most heavily affected. Some infected weeds are noted.

Westdal (P. H.), Barrett (C. F.), & Richardson (H. P.). **The six-spotted leafhopper, Macrosteles fascifrons (Stål.) and Aster yellows Chlorogenus callistephi H. in Manitoba.**—*Proc. ent. Soc. Manitoba*, **15**, p. 32, 1959.

Whereas the migrant population of *M. fascifrons* [see above] reached a peak of about 80 100 sweeps in mid-June on favoured foods such as cereals, that of the non-migrant population was about 450 in mid-Aug. Early maturing crops generally escape severe infection but it is often a problem on late crops.

Sommereyns (Ghislaine). **Remarques et observations concernant la transmission mécanique des virus des végétaux.** [Remarks and observations on the mechanical transmission of plant viruses.] –*Bull. Inst. agron. Gembloux*, **28**, 4, pp. 452–471, 1960. [70 ref.]

This review [cf. **40**, 160, *et passim*], based on the author's own experiments and on the relevant literature, of factors determining successful mechanical transmission of a plant virus, considers the effect upon susceptibility of the stage of growth reached by the plant to be inoculated and the choice of the particular leaf; the effect also of the light conditions prevailing before and after inoculation; the choice of the host and source plants; and substances acting directly upon the host plant or the inoculum (abrasives and reducing agents). From the evidence it is concluded that there is no single universally ideal method.

Annual Report of the West African Cocoa Research Institute, 1959–60. —87 pp., 1 pl., 1 graph, 1 plan, 1961. 5*s*.

Some of the work reported from Tafo Sta., Ghana [cf. **40**, 31], on virus diseases, black pod (*Phytophthora palmivora*), and a gall disease (pp. 17–34), has been noticed [**40**, 599 *et passim*]. J. W. Blencowe & A. A. Brunt give further evidence of the effect of viruses on the growth and yield of cacao; the experiments are still in progress. A planting to determine the resistance to or tolerance of cacao viruses in various vars. has been made. P. D. Turner's studies on strs. of *P. palmivora* [**40**, 350] are further detailed. An experiment is in progress to investigate the use of light mineral oil against black pod. Dealing with the importance of black pod in Ghana [**40**, 94, *et passim*], J. W. Blencowe & A. L. Wharton discuss the effects of insecticidal spraying upon incidence and losses. Studies on the transmission and etiology of the gall-forming disease by A. A. Brunt & A. L. Wharton are described [**40**, 272, cf. 600].

At the Ibadan Station, Nigeria, C. K. H. Martini, summarizing research on the transmission of Nigerian cacao viruses, presents evidence (pp. 68–69) in conflict with the view of Posnette *et al.* [**30**, 219] that cacao swollen shoot virus is more

readily transmitted by insects starved before acquisition feeding and that it can, therefore, be grouped with the aphid-transmitted, non-persistent viruses. Experiments showed that the amount of virus adhering to the stylets varied with the time spent by the insects on infected plants. Again no insect vector of cacao necrosis virus was found.

T. W. Tinsley reports that attempts to transmit cacao swollen shoot by means of parasitic plants were unsuccessful. Electromicroscopic examination at Rothamstead of isolates of the virus prepared in co-operation with C. K. H. Martini showed it to be a short, rigid rod about 220 mμ long.

J. M. Thresh observes (pp. 70–72) that swollen shoot is a good example of the slowly spreading systemic diseases in tree crops described by Van der Plank and is a typical 'crowd' disease [**28**, 50; **40**, 12]. The factors limiting spread have not been elucidated, but the small numbers of mealybugs present, their scattered distribution, and limited activity are probably the most important.

In investigations of the effect of swollen shoot on yield at Koroboto (pp. 73–74) significant negative correlations were obtained between the number of months the trees had borne symptoms and the pod yields/tree for the seasons 1954–5 and 1955–6. Yield in each season was also correlated with girth. The data obtained since 1954 clearly indicate a progressive deterioration of infected trees in the absence of capsid control [cf. **40**, 94].

J. M. Thresh & J. F. Longworth performed insectary experiments to determine the reaction of different cacao populations to swollen shoot infection. Amelonado budlings were extremely susceptible; they and the most susceptible Trinitario clones developed crinkling and abscission of the leaves, severe chlorosis, and swellings, but there was some evidence from other clones that the Trinitario group is a potential source of tolerance. The reaction of the Amazon populations was very variable.

Experiments at Koroboto indicated that virus-infected cacao is in a delicate state of balance with the environment and very sensitive to variations in light intensity.

D. Kay describes (pp. 78–80) 2 forms of cacao die-back, that caused by fungi, particularly *Calonectria rigidiuscula* [**40**, 600], and that due to physiological disorders. The most important aspect of die-back, once capsids have been controlled, is its interaction with swollen shoot virus. In Nigeria cacao appears to succumb to die-back most readily during early virus infection, when new die-back may arise from occluded, infected lesions present before spraying against capsids began. Amazon vars. appear to be less susceptible to *C. rigidiuscula* than Trinitario or Amelonado, but within a var. the tree to tree variation in susceptibility is high. Vars. selected for resistance to virus infection should also be tested for resistance to fungal die-back.

E. C. Hislop & P. O. Park describe (pp. 80–84) laboratory studies on the fungicidal control of black pod [cf. **40**, 215]. The distribution of deposits on cacao pods treated in the now modified laboratory sprayer is being examined by a stripping technique. Inoculation of pods with zoospores from agar cultures confirmed that 3 types of lesion may result: a small, usually discrete, water-soaked spot which often fails to develop and is considered to be a hypersensitive reaction; a rapidly expanding lesion with a mottled or reticulate appearance and an indefinite outline, which may later produce the third and typical, rapidly enlarging, brown lesion with a more or less distinct margin. It was found that zoospores produced by 8-day old cultures were more sensitive to $CuSO_4$ than those from cultures 12 days old.

J. F. Longworth records (p. 84) that trees with galls on flowering cushions were found at Moor Plantation, Ibadan. Pollarding below the gall (if on the trunk) or excising the galls (on lateral branches) appeared to cure the condition.

Archibald (J. F.). **Transmission of gall diseases of Cacao, Mango, and Pigeon Pea.** —*Nature, Lond.*, **190**, 4772, p. 284, 1961.

In studies by Bookers Sugar Estates, Ltd., Georgetown, British Guiana, half beans of cacao treated with inoculum from 'green-point' gall [**40**, 600] developed galls after 3 weeks–1 month and germinated markedly more slowly than controls. Similar inoculations by distilled water washings and tissue extracts from galls on mango and pigeon pea, resembling 'green-point', produced galls on cacao cotyledon axils after about 1 month. Galls transmitted from mango were indistinguishable from those transmitted from cacao 'green-point', and galls from pigeon pea were also generally similar to them, but in some the axillary bud enlarged very considerably and became chlorotic, with no proliferation of other buds; the germination rate of treated plants was comparable with that of the controls. Mango gall was also transmitted by inoculation of the axillary bud of a 2-month-old cacao seedling with tissue extract. Cultivation of cacao near mango and pigeon pea plantations should be avoided.

Atanasov (D.) & Dodov (D.). Вирусни болести по житните. [Virus diseases of the Gramineae.]—Раст. Защ. [*Rast. Zasht.*], **9**, 2, pp. 13–19, 1 fig., 1961. [Russ., Engl. summ. 21 ref.]

A review from the Central sci. Res. Inst. Plant Prot., Sofia, of the virus diseases of numerous cereals and grasses [listed] in Bulgaria, known under the collective names 'kazŭlyanŭk' or 'red burn', 'sarŭyanŭk' or 'yellow burn', and in part 'chalgŭn'. Some of them are very similar to the non-parasitic diseases of wheat and barley described by Straib [**18**, 98] and to 'firing' of wheat [**16**, 244] and 'grass-clump' (*Res. Bull. Coun. sci. industr. Res. Aust.* 104, 1937). In particular *Phragmites communis* and *Arundo donax* are heavily attacked (up to 100%) by such mosaic viruses, and thus represent a notable source of infection. A mosaic of wheat resembles that caused by wheat mosaic virus in the U.S.S.R. [cf. **37**, 345] and another of rice that caused by the Japanese rice dwarf virus [cf. **40**, 301]. Symptoms of other virus diseases of cereals and grasses are described.

Fleming (J. R.), Johnson (J. A.), & Miller (B. S.). **The control of fungi during the malting of Wheat.** —*Cereal Chem.*, **38**, 2, pp. 170–178, 1 fig., 1961. [21 ref.]

At Kansas agric. Exp. Sta., Manhattan, formaldehyde at 0·05% in the steep liquor during the last 1–6 hr. of steeping, or 8-hydroxyquinoline sulphate, completely inhibited fungal growth on wheat during malting. The amount of formaldehyde in the finished malt, 0·003 p.p.m., did not inhibit yeast fermentation and is considered insignificant in its effect on bread. A number of other fungicides which were effective to various degrees are also noted; some, however, are not of practical value owing to their toxicity to men and animals.

Caldwell (F.). **Entry of fungi and chemical substances in solution into mature cereal grains.**—*J. Sci. Fd Agric.*, **12**, 3, pp. 169–174, 1961. [28 ref.]

Writing from White House of Speen, Aylesbury, Bucks., the author reviews the literature under the headings: functional significance of the outer layers of mature cereal grains; their resistance to the entry of fungi and their semi-permeability to chemical substances in solution, and absorption of solutes by the grain. The nature of the semipermeable system is considered, as are its relation to grain viability, response to fungicides, and the possibility of accelerating germination by fungicidal treatment, as in the stimulation of some seeds by Cu fungicides.

Boevskiĭ (A. S.), Rŷzhkova (Mme Z. F.), & Mokrotovarov (S. P.). Фузариозный трахеомикоз яровой Пшеницы и других хлебных злаков. [*Fusarium* tracheomycosis of summer Wheat and of other cereals.] —Труд. Воронеж. Ста.

Защ. Раст. [*Trud. Voronezh. Sta. Zashch. Rast.*], *1960*, 15, pp. 71–101, 1960. [Abs. in *Referat. Zh. Biol., 1961*, 10, Sect. G, p. 76, 1961.]

Researches in 1954–56 at the Voronezh Plant Protect. Sta. disclosed a new masked form of infection by *Fusarium* (*F. equiseti*, *F. oxysporum*, and *F.* sp.) in cereals [cf. **40**, 354]. The fungi were present in the roots from tillering onwards, in the parenchyma, and the vascular system of the stem. The number of infected plants increased with age, sometimes reaching 100%. Summer wheat was especially susceptible. The production of simple chemical compounds exogenously and endogenously by the fungi, was demonstrated. They filtered well through dense asbestos filters, were water soluble, and resistant to high temp. There was no sharp distinction in susceptibility between the summer and winter wheat and rye vars. zoned in the district.

Baldanzi (G.). **O problema da desinfestação das sementes na cultura do Trigo.** [The problem of seed disinfection in Wheat growing.]—*Rev. Agric. Piracicaba*. **36**, 1, pp. 19–23, 1961. [Engl. summ.]

At the Estação Experimental, Curitiba, Brazil, seed treatment with neantina (Bayer) at 200 g./100 kg. seed increased yields by about 10% in 1958 and 1959.

Spalding (D. H.), Bruehl (G. W.), & Foster (R. J.). **Possible role of pectinolytic enzymes and polysaccharide in pathogenesis by Cephalosporium gramineum in Wheat.**—*Phytopathology*, **51**, 4, pp. 227–235, 1 fig., 3 graphs, 1961.

Most of this information has been noticed [**40**, 411].

Macer (R. C. F.). **Saprophytic colonization of Wheat straw by Cercosporella herpotrichoides Fron and other fungi. The survival of Cercosporella herpotrichoides Fron in Wheat straw.**—*Ann. appl. Biol.*, **49**, 1, pp. 152–164, 1 pl.; pp. 165–172, 1961. [15, 22 ref.]

In further studies at Univ. Cambridge on facultative parasites in soil [cf. **38**, 577], noticed in part [**40**, 97], *C. herpotrichoides* in liquid cultures utilized organic and inorganic sources of N and displayed an absolute requirement for thiamin; none of the isolates tested was able to synthesize this substance. On nutrient agar and through sterilized straw the fungus grew more slowly than other facultative parasites of cereal roots and stem bases. The observation that the saprophytic colonization of straw tissue by *Ophiobolus graminis* declined as invasion progressed inwards was confirmed; the phenomenon was demonstrated also for *C. herpotrichoides* and *Helminthosporium sativum* [*Cochliobolus sativus*], but not for *Fusarium culmorum Cercosporella herpotrichoides* is, it is considered, unlikely to colonize straw in the soil.

In the 2nd paper investigations are described in which test pieces of straw containing *C. herpotrichoides* were buried in unsterilized soil in laboratory containers and in the field. The fungus survived with virtually undiminished vitality in straw buried for up to 3 yr. Straw colonized by *C. herpotrichoides* decomposed more slowly in soil than did uninoculated straw. The saprophytic survival of the fungus is undoubtedly an important part of the epidemic cycle of the eyespot disease of cereals.

Basile (Rita), Leonori-Ossicini (Agnese), & Zitelli (Giuseppina). **Le razze fisiologiche di Puccinia recondita Rob. ex Desm. [= P. rubigo-vera (DC.) Wint. f.sp. tritici (Erikss.) Carl.] identificate durante l'anno 1957.** [The physiologic races of *P. recondita* identified during the year 1957.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, **18**, 1, pp. 93–96, 1960. [Engl. summ.]

This paper has been noticed [**39**, 224].

Sibilia (C.). **La forma ecidica della ruggine bruna delle foglie di Grano (Puccinia recondita Rob. ex Desm.) in Italia.** [The aecidial state of brown leaf rust of Wheat (*P. recondita*) in Italy.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, **18**, 1, pp. 1–8, 1 col. pl., 1960. [Engl. summ. 25 ref.]

After briefly reviewing the history of the search for the aecidial state of *P. recondita* [cf. **36**, 460; **39**, 224, *et passim*], the author records its discovery on *Thalictrum foetidum* in Piedmont. From the material obtained 5 physiologic races of the fungus already present in Italy were isolated, 58, 62, 165, and 167, together with 1 thought to be new to the world, R 36.

Wolfswinkel (L. D.). **Voorlopige studies oor die jaarlikse ontwikkeling en tussenseisoense oorlewing van stam- en blaarroes Puccinia graminis tritici en P. triticina in Wes-Kaapland.** [Preliminary studies on the annual development and interseasonal survival of stem and leaf rust (*P. graminis* and *P. recondita*) in the Western Cape.]—*S. Afr. J. agric. Sci.*, **4**, 1, pp. 17–33, 1961. [Engl., Fr. summ.]

At the Stellenbosch-Elsenburg agric. Coll. it was found that, in the absence of intermediate hosts, the uredospores of *P. graminis* [**37**, 223] and *P. recondita* [**37**, 765] constitute the only possible means of interseasonal survival in this area. Rust recordings were made on the 3rd leaf from the apex, so that despite the age differences of plants in monthly sowings, the leaves observed were all subjected to rust infection for the same period. While *P. recondita* occurred throughout the year, *P. graminis* was absent in July–Sept.; wheat plants were increasingly susceptible to both rusts up to 3 months old, but those sown Feb.–May seldom became infected. Longevity of uredospores under controlled temp. and humidity was found to be so limited that interseasonal survival in the W. Cape is thought to be unlikely, and this accounts for general absence of the rust in the field from May–Sept.

Watanabe (Y.), Mukade (K.), & Kokubun (K.). **Studies on the production of amphidiploids as the source of resistance to leaf-rust of Wheats. V. Cytogenetic studies on the F_1 hybrids and the amphidiploids, Triticum timopheevi Zhuk. × Aegilops umbellulata Zhuk. VI. Cytogenetic studies on the amphidiploids, Triticum timopheevi Zhuk. × Agropyron elongatum (Host.) Beauv. (n = 7).** —*Jap. J. Breed.*, **10**, 3, pp. 169–173; 4, pp. 209–214, illus., 1960. [Jap. with Engl. summ. *Biol. Abstr.*, **36**, 9, p. 345, 1961.]

To obtain a good source of resistance to *Puccinia triticina* [*P. recondita*: **40**, 461] the amphidiploid of *T. timopheevi* and *Aegilops umbellulata* was synthesized by treating F_1 seeds with 0·05% colchicine. The grains of the hybrid were large and adhered firmly to the glumes. The plants were immune from many races of the rust and readily crossed with cultivated *vulgare* vars. and with other spp. in the Dinkel series.

The other amphidiploid, that between *T. timopheevi* (2n = 28, AAGG) and *Agropyron elongatum* (2n = 14, ?), was also obtained by colchicine treatment. Not only did the new amphidiploid have high sexual compatibility with *T. timopheevi* but it crossed easily also with many vars. of common wheat, though not with *A. elongatum*, and was immune from many races of *P. recondita*.

Anderson (R. G.). **The inheritance of leaf rust resistance in seven varieties of common Wheat.**—*Canad. J. Pl. Sci.*, **41**, 2, pp. 342–359, 1 fig., 1 graph, 1961. [20 ref.]

At the Canada Dept Agric., Winnipeg, Man., the inheritance of seedling resistance to races 1a, 5a, 11, 15a, and 126a of *Puccinia recondita* [cf. **40**, 1] was studied in Exchange and Selkirk, and to races 1a and 15a in Lee, Gabo, Timstein, Mayo 52, and Mayo 54, Thatcher being used as the susceptible var. F_1 and F_2 populations of

diallele crosses among these vars. and F_2 families from backcrosses to Thatcher were studied. Of the 2 genes found, Lr_E conditions a (2) type reaction to all 5 races in Exchange and Selkirk, and Lr_L (; 1 =) type reaction to races 1a and 15a in all 7 vars.; isogenic lines with these genes are being developed in Prelude and Thatcher. The increase of leaf rust on Lee and Selkirk is explained by the increase of races which render the gene Lr_L ineffective in these 2 vars.

Basile (Rita), Leonori-Ossicini (Agnese), & Zitelli (Giuseppina). **Razze fisiologiche di Puccinia graminis var. tritici, identificate in Italia nel 1959.** [Physiologic races of *P. graminis* f. sp. *tritici* identified in Italy in 1959.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, **18**, 1, pp. 19–22, 1960. [Engl. summ.]

In all, 40 races [cf. **39**, 687; **40**, 353] were identified from 168 isolates. New for Italy were: 2, 13, 15, 39, 79, and 145; 15 is of particular interest owing to its widespread occurrence elsewhere.

Loegering (W. Q.), McKinney (H. H.), Harmon (D. L.), & Clark (W. A.). **A long term experiment for preservation of urediospores of Puccinia graminis tritici in liquid nitrogen.**—*Plant Dis. Reptr*, **45**, 5, pp. 384–385, 1961.

In a preliminary test at the Crops Res. Div. and the American Type Culture Collection freezing in liquid N did not noticeably alter the infectibility of the uredospores [cf. **36**, 776]. In a further test, started on 1 Dec. 1960, 4 treatments are being tested: vacuum drying for refrigerator storage (4° C.), vacuum drying, air-drying and sealing, and hydration (air-dried spores held over water for 4 hr. before sealing), the last 3 being frozen in liquid N and stored in a liquid N refrigerator (—196°). In Jan. 1961 tests revealed little difference between treatments, though there were slight differences between races.

Narkiewicz-Jodko (J.). **Wpływ zadrzewień śródpolnych na rozprzestrzenianie się mączniaka Pszenicy (Erysiphe graminis DC.).** [Effect of trees in fields on the dissemination of Wheat mildew (*E. graminis*).] –*Biul. Inst. Ochr. Rośl., Poznań, 1960*, 10, pp. 105–128, 6 fig., 1 diag., 9 graphs, 1960. [Russ., Engl. summ. 16 ref. Cyclostyled.]

At Turew Res. Sta., Polish Acad. Sci., and in some other localities of the Koscian district assessments of *E. graminis* on wheat at various distances from the trees in 1954–59 disclosed higher incidence only in their immediate surroundings, this being attributed to different soil composition, reduced humidity, and the shade, which weaken the wheat plants and favour the spread of the fungus. The results are discussed in detail.

Górska-Poczopko (Jadwiga). **Próba biometrycznej analizy szkodliwości zgorzeli podstawy źdźbła (Ophiobolus graminis Sacc.) na Pszenicy w Polsce.** [Trial on a biometrical analysis of the harmfulness of foot rot (*O. graminis*) on Wheat in Poland.] –*Prace nauk. Inst. Ochr. Rośl., Poznań*, **2**, 2, pp. 81–107, 3 fig., 1960. [Russ., Engl. summ. 17 ref.]

A method for the assessment of damage by *O. graminis* [cf. **39**, 406] is described. Measurements of infected plants (tabulated) of 11 wheat samples from different parts of Poland showed an av. reduction of stem length by 21·19 cm. (21·6%), of ear length by 1·3 cm. (18·3), of seed/ear by 11·35 (51·8), and of 1,000 seed wt. by 20·512 g. (48·1).

Scott (H. A.). **Serological detection of Barley stripe mosaic virus in single seeds and dehydrated leaf tissues.**—*Phytopathology*, **51**, 3, pp. 200–201, 1 fig., 1961.

At the Plant Virology Lab., Beltsville, Md, single seeds of Glacier barley infected by stripe mosaic virus (BSMV) [**40**, 602] which had been stored for 6½ yr. were

ground and placed in 0·1 ml. buffered saline on agar columns in 2 mm. diam. glass tubes. Below the agar, which contained 1:10,000 merthiolate, was 0·05 ml. 1:10 BSMV antiserum. The tubes were maintained at 8° C. in Petri dishes wrapped in moist towelling. After 2–3 weeks the precipitin bands in the central part of the column could be distinguished from non-specific bands which occurred also with healthy seed and in the normal serum and saline controls. The material causing the non-specific banding was removed when the virus was purified by centrifugation; diseased material gave positive reactions within 5 days. The technique was also applied successfully to infected barley and wheat leaves that had been desiccated and kept at 1° for 2 months–7 yr.

Атавекоv (I. G.) & Razvyazkina (Мме G. M.). Штриховатость Ячменя. [Stripe of Barley.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 6, p. 56, 2 fig., 1961.

In the summer of 1960 barley stripe [mosaic virus] on barley leaves was noticed in the fields of the Timiryazev agric. Acad., U.S.S.R. Symptomatology, transmission, and the reaction of *Chenopodium amaranticolor* [cf. **40**, 164] identified the disease. The vars. Gana Loosdorfskaya and Viner were < 30–40% infected, while Timiryazevets remained free. The virus was transmitted experimentally to rye, winter wheat, and millet.

Green (G. J.) & Bendelow (V. M.). **Effect of speckled leaf blotch, Septoria passerini Sacc., on the yield and malting quality of Barley.**—*Canad. J. Pl. Sci.*, **41**, 2, pp. 431–435, 1961.

Inoculation of barley in field plots at the Canada Dept Agric., Winnipeg, Man., with *Septoria passerinii* [cf. **40**. 529] for 5 yr. caused statistically significant yield reductions (ca. 20%) in 2 yr. and insignificant reductions in 2 other yr., and it also reduced suitability for malting, since kernel shrinkage increased cleaning losses and decreased the amount of malt extract.

Morton (D. J.). **Percentage yield loss as related to percentage loose smut in Barley.**—*Plant Dis. Reptr*, **45**, 5, pp. 348–350, 1961.

Portions of 10 seed samples with different percentages of *Ustilago nuda* [cf. **22**, 61; **40**, 297] were disinfected by an anaerobic treatment at N. Dak. agric. Exp. Sta., Fargo, and compared with non-treated in yield tests. A regression coefficient for the av. yield loss and smut percentages shows that percentage loss increased 0·86 with each 1% increase in smut.

Lindsten (K.). **Studies on virus diseases of cereals in Sweden. I. On the etiology of a serious disease of Oats (the Bollnäs disease). II. On virus diseases transmitted by the leafhopper Calligypona pellucida (F.).** *K. LantbrHögsk. Ann.*, **27**, pp. 137–197, 11 fig., 8 graphs, 5 maps; pp. 199–271, 5 fig., 1 diag., 2 graphs, 2 maps, 1961. [80+113 ref.]

Much of the information in these exhaustive surveys has been presented [**40**, 604]. Further evidence is now adduced in support of the view that *C.* [*Delphacodes*] *pellucida* is a vector of 2 viruses, one causing oat dwarf tillering (ODTD) and the other the oat striate and red disease (OSRD); the former is regarded as the major component of Bollnäs disease. The OSRD virus is widespread in Sweden, whereas the more destructive ODTD is confined mainly to the Bollnäs district. Extensive field observations from 1958 to 1960 showed the latter to be responsible for frequent almost total failures of the crop.

The 1st symptoms of ODTD on oats—short, faint streaks, mostly on the lower

leaf surfaces, stunting, and swelling of the stem bases —are followed by the characteristic dwarf tillering, producing a bushy appearance, and frequently by the development of enations. The streaks formed by OSRD are more elongated and often expand into blotches, while no excessive tillering or enations occur. Barley, wheat, and rye attacked by ODTD show much milder symptoms and are appreciably less damaged than oats.

All the *Avena* spp. inoculated, except *A. nuda*, of which only a few plants were available, proved susceptible to both viruses. Of 6 fodder grasses tested, only *Lolium perenne* was infected by both.

Certain changes which occurred in the chemical composition of plants infected by ODTD are detailed.

The ODTD virus does not appear to be seed- or soil-transmissible, while attempts to transmit it mechanically also failed. Among a number of insects, including leafhoppers, tested as potential vectors, only *D. pellucida* and *Dicranotopsis hamata* proved capable of transmission; the former alone is considered to be of practical importance. Some difficulty seems to be experienced in the acquisition of the virus by the leafhoppers, but once it has become established it generally persists for the lifetime of the individual. Although infection may be successful after a ½-hr. feeding period, up to 72 hr. is usually requisite. The min. incubation period in the leafhopper was 16 days at 23±3° C., but at 15±3° it was 32 days. In plants the incubation period is 2–3 weeks, temp. variations being apparently a less important factor than for the insects. The ODTD virus, unlike that of OSRD, has not been found to pass through eggs to the progeny. Both viruses are able to overwinter in their insect vector. *D. pellucida* retained its infectivity after periods of up to 4 days at 33·5°. The existence of cross-protection between the 2 viruses could not be demonstrated, but ODTD strongly inhibited transmission of OSRD to oats, though not to wheat.

Comparative tests of *D. pellucida* collected after various cereal crops revealed highly significant differences in infectivity of ODTD, the max. percentage occurring after oats and the min. after wheat. This partial elimination of the virus from the leafhopper population in wheat and barley offers hopeful prospects for control.

Zimmer (D. E.) & Schafer (J. F.). **Relation of temperature to reaction type of Puccinia coronata on certain Oat varieties.**—*Phytopathology*, **51**, 3, pp. 202–203, 1961.

At Dept Bot., Purdue Univ., Lafayette, Ind. [**38**, 474], seedling reactions of Canuck, Clinton 59, Glabrota, and Saia, inoculated with races 202, 263, and 295 of *P. c.* var. *avenae* [**40**, 220, 530], were determined at 60°, 70°, and 80° F. Higher temps. reduced the incubation period, full symptom expression requiring 9 days at 80° and 14 at 60°. The reaction of Glabrota to race 263 varied from '0' at 60° to type 3 at 80°, but reaction to the other races, and that of the other vars. to all races, did not alter with temp. in the range tested. The result with Glabrota must be attributed to the effect of temp. on the specific host-parasite interaction. When infected seedlings were transferred, after uredial development, from 80 to 60° a necrotic area developed round the type 3 pustule, whereas the reverse transfer induced the development of secondary sporulating uredia round the edge of the necrotic 0 fleck [cf. **39**, 404], showing that the rust mycelium was still alive and able to sporulate when the altered temp. produced a favourable host environment.

Campbell (W. P.) & Skoropad (W. P.). **Grey speck of Oats in Alberta.**—*Canad. Pl. Dis. Surv.*, **41**, 3, pp. 156–161, 1961. [22 ref.]

The Plant Path. Lab., Edmonton, Alta, reports that grey speck of oats (Mn deficiency) [cf. **34**, 593; **40**, 300] is widely but sporadically scattered through central and northern Alta.

Molot (P.) & Simone (J.). **Les helminthosporioses du Maïs.** [Helminthosporioses of Maize.]—*C.R. Acad. Agric. Fr.*, **47**, 4, pp. 201–205, 1961.

To control *Helminthosporium turcicum* [cf. **39**, 698] 1,300 sq. m. of the susceptible maize var. Iowa 4417 growing at Saint-Martin-de-Hinz (Landes) were sprayed 8 times (from 8 July until 21 Sept. 1960) with 1,300 l. ha. zineb, phaltan, Cu oxinate, cuprèbe, ziram, carbatène, thiram, Zn pyridine-thione, or maneb (each at 0·21% active material). The number of lesions stool (av. of 4 blocks) on 3–4 Oct. was 6·26 for maneb, 6·47 for zineb, and 40·17 for the untreated; the other materials tested were unsatisfactory. In practice, maize requires effective protection only during 30–40 days after the emergence of the stigmas.

Hale (M. G.) & Roane (C. W.). **The nutrition of Helminthosporium carbonum race 1 in relation to parasitism of Corn.**—*Phytopathology*, **51**, 4, pp. 235–240, 4 graphs, 1961.

At Va agric. Exp. Sta, Blacksburg, *H. carbonum* [**40**, 210, 605] grew well on a variety of C and N sources and without growth substances. Growth was related to the amount of N and carbohydrate available in the medium, to the N source, and to the pH. Resistance in maize plants could not be correlated with sugar levels or with free amino acids. Alcoholic extracts of diseased, susceptible plants inhibited growth *in vitro*, but not extracts of diseased resistant or uninfected plants.

Boguslawski (W.). **Wstępne obserwacje nad występowaniem głowni zwyklej (Ustilago zeae Unger) na Kukurydzy w zależności od terminu siewu, nawożenia preparatem torfowym oxyhum i sposobu zakażenia.** [Preliminary observations on the occurrence of blister smut (*U. maydis*) in Maize in relation to the time of sowing, fertilization with the peat preparation oxyhum, and the mode of infection.]—*Biul. Inst. Ochr. Rośl., Poznań, 1960*, 10, pp. 193–202, 1960. [Russ., Engl. summ. Cyclostyled.]

At Reguły, Poland, chlamydospores of *U. maydis* [cf. **40**, 102] placed on the surface of maize seeds sown 5 cm. deep failed to produce infection. The time of sowing and the use of oxyhum had no demonstrable effect on the ultimate degree of smut.

Tuley (P.). **Puccinia polysora on Tripsacum laxum and Zea mays.**—*Nature, Lond.*, **190**, 4772, p. 284, 1961.

Though no morphological distinction between these *P. polysora* isolates [cf. **38**, 515] could be detected at the Umadike agric. Res. Sect., Umuahia-Ibeku, E. Nigeria, they are certainly different and *T. laxum* in E. Nigeria is at present free from the rust. In Trinidad in 1953–4 cross-inoculation between the 2 hosts with uredospores was unsuccessful in contrast to routine self-inoculations.

Pavgi (M. S.) & Dickson (J. G.). **Influence of environmental factors on development of infection structures of Puccinia sorghi.**—*Phytopathology*, **51**, 4, pp. 224–226, 7 fig., 1961.

At Univ. Wis., Madison, the formation of appressoria, vesicles, and hyphae by uredospores of *P. sorghi* [**40**, 413] was stimulated by placing a cellophane membrane between the agar medium and the spores and was the same as on the host (maize) when conditions were equal. $ZnCl_2$ at 12 p.p.m. and $ZnSO_4$ at 10 p.p.m. were toxic and were not essential for vesicle formation. Opt. conditions for spore germination were 2 hr. in the dark at 17° C. followed by 4 hr. under incandescent light (200 ft. candles) at 24°.

Barnes (J. M.). **Investigation on stalk rot of Corn caused by Gibberella zeae : Part I. A comparison of two methods of evaluating the severity of stalk rot in several**

Corn varieties. Part II. Aspects of the biochemical nature of stalk rot resistance. —*Diss. Abstr.*, **21**, 6, pp. 1321–1322, 1960.

A comparison of 2 methods at Cornell Univ. during 1957–8, following inoculation of the stalks of 11 maize vars. with *G. zeae*, revealed that visual estimation was as accurate as a quantitative measuring method. Standard deviations of disease reactions indicated a high degree of variability associated with the inoculation method.

Bioassays indicated that an inhibitory component was in significantly higher conc. in a resistant hybrid than in a susceptible at the full silk and milk stages. The antifungal component is apparently fungistatic to *G. zeae*. The ether-soluble, antifungal compound 6-methoxybenzoxazolinone (MBOA) was not found in the free state in maturing maize plants, but as the glucosidic precursor. The fungus was not capable of cleaving the glucoside and releasing the inhibitory compound. It is postulated that the invading fungus may cause host cell irritation, which in turn could stimulate a host plant enzyme(s) to release the antifungal compound. A benzene-methanol-water extract of shredded, incubated maize tissue markedly stimulated the growth of *G. zeae*. The fungus was relatively insensitive to purified MBOA, and 50% growth inhibition would be expected at a conc. of approx. 800 p.p.m. It is suggested that studies on the development of susceptibility to stalk rot in maturing maize might be more important than considerations of mature plant resistance based on the activity of an antifungal compound.

Craig (J.). **Physiological, chemical and morphological plant factors in Zea mays L. associated with Diplodia stalk-rot reaction.**—*Diss. Abstr.*, **21**, 6, pp. 1322–1323, 1960.

A selected group of maize inbreds with a range of reaction to *D. zeae* [*D. maydis*: **39**, 572; **40**, 358] studied over 2 yr. at Univ. of Ill., differed significantly in disease reaction, but no relationship between stalk rot reaction and levels of N, ash constituents, or sugars was evident. In 12 inbred lines susceptibility was negatively correlated with pith density, low density being considered indicative of senescence. The trend in sugar content showed a closer relationship with stalk rot reaction than did the actual content. There was a significant negative correlation between increases in sugar content after silking and susceptibility. Inoculation of a resistant inbred on 10 Sept. gave a significantly higher stalk rot score than inoculation on 10 or 20 Aug. Stalk rot was induced in maize plants in the greenhouse by soil infestation with *D. zeae* when the plants were 8 weeks old. Initial infection occurred in the roots and then progressed to the crown and stalk. The hyphae in the pith parenchyma cells of resistant inbreds were lumpy, granular, and closely appressed to the inner cell wall. Intercellular spaces and necrotic pith cells in which hyphae were not distinguishable were filled with a dark brown substance, but necrotic tissue of susceptible inbreds contained abundant, ramifying, intracellular hyphae, with lighter browning of necrotic tissue. Reactions of the cortical cells of infected roots were similar. The degree of susceptibility to *D. maydis* is in direct proportion to the degree of senescence of the invaded tissue.

Kul'pinova (Mme M. P.). Эффективные протравители семян. [Effective seed treatments.]—Кукуруза [*Kukuruza*], **6**, 1, pp. 43–44, 1 fig., 1961.

From the Stavropol' Select. Testing Sta., All-Union sci. Res. Inst. for Maize, 12–25% loss of germinating maize seed in the Stavropol area is reported to be due to spp. of *Fusarium*, *Penicillium* [**40**, 166], and *Aspergillus* and soil pests.

In 1958–9 field germination was 90·1 and 90% after seed treatment with 50% thiram+gamma-BHC at 2 kg./ton seed, and 89·7 and 93%, respectively, at 4 kg./ton. In 1958 mercuran at 1·5 kg./ton [cf. **39**, 23] gave 89·8% germination, and 50% thiram 79·9 and 78·7% at 2 and 4 kg./ton, respectively.

The best machines were AB-2, PU-1, and PU-3, which thoroughly mixed seed and fungicide.

Ghose (R. L. M.), Ghatge (M. B.), & Subrahamnyan (V.). **Rice in India. 2nd Edition.**—ix—474 pp., numerous illus., New Delhi, Indian Council agric. Res., 1960.

This work incorporates all the available information on the crop and includes the results of research reported since the 1st edition, 1956. Chapt. 7 (pp. 67–73) deals with fungus diseases, research work on which is covered by chapt. 16 (pp. 228–247), and chapt. 20 (pp. 269–272) outlines the organization and working of plant protection and quarantine. The fungi recorded on rice in India are listed in Appendix II. The references (pp. 279–296) at the end of Part I, Agriculture, include those on plant diseases.

Gibler (J. W.), Jennings (P. R.), & Krull (C. F.). **Natural occurrence of hoja blanca on Wheat and Oats.** —*Plant Dis. Reptr*, **45**, 5, p. 334, 1961.

Rice hoja blanca virus disease was 1st observed on wheat and oats in 1960 in nurseries at Palmira agr. Exp. Sta., Dept Valle del Cauca, Colombia [**40**, 605]. *Sogata orizicola* transmitted from rice to both hosts, as well as to barley and other Gramineae. *S. cubana* failed to transmit to the cereals.

Thung (T. H.). **Hoja blanca, een schadelijke virusziekte bij de rijstcultuur.** [Hoja blanca, a harmful virus disease of Rice.]—*Landbouwk. Tijdschr., Wageningen*, **72**, 8 (*Meded. Lab. Virol., Wageningen*, 13), pp. 290–295, 1960. [Engl. summ.]

The author reviews some of the literature on this disease [cf. **40**, 413] and suggests that the Cuban and Venezuelan strs. of the virus differ from each other [**37**, 282].

Nishihara (T.). **On the varietal and local differences of chemical components of Rice plant with special reference to bacterial leaf blight.**—*Bull. Fac. Agric. Kagoshima Univ.* **8**, pp. 119–132, 1959. [Japanese. Abs. from Engl. summ. 18 ref. Received 1961.]

Tests at Lab. Fertilizers of 8 vars. from 3 localities for 8 mineral components revealed that varietal differences for each component were less distinct than the local differences and changed with the locality in most cases. No correlation was found between these differences and resistance to bacterial leaf blight [*Xanthomonas oryzae*: **40**, 104, 414].

Baba (I.) & Tajima (K.). **Studies on the nutrition of Rice plant with reference to the occurrence of so-called 'akagare' disease. VII. On the process of the occurrence of a kind of 'akagare' showing chlorosis of leaf as an incipient symptom.** —*Proc. Crop Sci. Soc. Japan*, **29**, 3, pp. 326–328, 1 diag., 9 graphs, 1961. [Jap. Engl. summ.]

In further studies at the Nat. Inst. agric. Sci., Japan [cf. **40**, 303], a type II 'akagare' occurring on rice on badly drained paddy soil with excessive humus was investigated. Leaf chlorosis before the appearance of the reddish brown spots characteristic of type I 'akagare' was the main symptom.

Types I and II were similar in response to ambient surroundings, seasonal variations in infection, and in abnormal metabolism in infected plants but II showed a lower response to K. Roots of paddy rice vars. with high sugar+starch content showed greater physiological activity and therefore had a higher resistance to both types of 'akagare' than vars. with a low sugar+starch content.

When some organic acids (butyric, formic, or lactic acids) [**40**, 105] were added to the soil or culture solution chlorosis and reddish brown leaf discoloration sometimes developed.

Type I 'akagare', therefore, is thought to be due mainly to K deficiency in the plant itself, type II being caused by the introduction of harmful substances, such as organic acids. Both types are produced by a similar disruption of the plant metabolism which is described.

Lÿsov (V. N.). Биологические и хозяйственные особенности образцов Проса Китая и их селекционное значение. [The biological and agricultural characters of Millet samples from China and their importance in selection.] —*Sel. Seed-Gr., Moscow*, **26**, 2, pp. 65–67, 1 fig., 1961.

As the result of numerous expeditions over a long period, the All-Union Inst. for Plant-growing obtained 187 specimens of millet [*Panicum miliaceum*] from different parts of China and 87 specimens biologically similar to those from China from different parts of Primor'e. Specimens of the latter group were resistant to [unspecified] leaf bacteriosis and some of them to smut [*Sphacelotheca destruens*: **40**, 303]. Crosses with specimens resistant to *S. destruens* gave resistant progeny. The best specimens from both groups are promising for breeding for resistance.

Vogel (R.). **Note sur la présence des maladies à virus des Agrumes en Corse.** [Note on the presence of virus diseases of Citrus in Corsica.] —*Fruits d'outre-mer*, **16**, 3, pp. 137–142, 6 fig., 1 map, 1961.

A preliminary survey in 1959 showed that citrus psorosis [map 65] is the most prevalent of the viroses. Psorosis A (scaly bark str.) was found on only a few isolated orange trees, but symptoms of the concave gum and blind pocket strs. [cf. **37**, 476] occurred in most orchards visited, particularly on mandarin oranges > 20 yr. old. Nearly all the mandarin and clementine trees examined had marked symptoms of xyloporosis [374]. Symptoms resembling those of stubborn disease [375] were noted on Washington Navel oranges, clementines, and Marsh pomelos [grapefruit]; the disease probably affects trees over 20 yr. old though its importance has not been assessed. There was some evidence of exocortis [291] in a plantation of citrus grafted on *Poncirus trifoliata*, and further investigation is to be made.

Weathers (L. G.) & Calavan (E. C.). **Additional indicator plants for exocortis and evidence for strain differences in the virus.**—*Phytopathology*, **51**, 4, pp. 262–264, 4 fig., 1961.

At Dept Plant Path., Univ. Calif., Riverside, citrus exocortis virus [**38**, 692] was detected by graft inoculation of Palestine sweet lime, Dorshapo sweet lemon, and Cuban shaddock with budwood from infected Eureka lemon. Bark splitting occurred, followed in shaddock by scaling below the soil line; all the trees, particularly shaddock, were stunted. No symptoms developed on any of the other 81 citrus spp. or vars. tested. The virus from CES Eureka lemon is believed to be a distinct str.

Reichert (I.) & Bental (A.). **On the problem of xyloporosis and cachexia diseases of Mandarins.**—*Plant Dis. Reptr*, **45**, 5, pp. 356–361, 7 fig., 1961. [16 ref.]

Investigation by Nat. Univ. Inst. Agric., Rehovot, Israel, of 200 Clementine orange scions on sweet lime and 22 on sour orange showed 3 types of disease: cachexia [**30**, 226; **39**, 577], with gum pockets as well as xyloporotic type pegs in the bark; xyloporosis [**40**, 305]; and an inverse pitting with tiny pits on the inner bark surface opposed to pin-point-like outgrowths in the wood [cf. **36**, 317]. Most of the sweet lime had symptoms of xyloporosis, as did 20% of the scions, 47·5% with cachexia, and 10% inverse pitting, alone or associated with the other symptoms. This combination on lime caused the worst decline, xyloporosis the least; this stock is thus more resistant to xyloporosis. All the scions on sour orange had cachexia but less

decline than on lime. Xyloporosis in the scions did not increase the decline caused by it when in the stock.

The contradictory results obtained in transmission experiments elsewhere [**36**, 99; **39**, 310] are explainable if it be assumed that sometimes budwood carried only cachexia, but at others xyloporosis as well. It is concluded that mandarin oranges may be affected by the 3 conditions described; inverse pitting would appear to be a separate disorder, but this needs confirmation, and there is support for the view that cachexia and xyloporosis are distinct.

McClean (A. P. D.). **Transmission of tristeza virus to Aeglopsis chevalieri and Afraegle paniculata.** *S. Afr. J. agric. Sci.*, **4**, 1, pp. 83–94, 2 pl. (8 fig.), 1961. [Afrik., Fr. summ.]

From the Div. of Plant Path., Pretoria, data are presented showing that citrus tristeza virus [**40**, 222] is readily transmitted to these 2 spp. by *Toxoptera citricidus*, but not across the graft union between them and spp. of *Citrus*, owing to incompatibility and a resulting poor union. After passage through the 2 spp. the virus could still induce seedling yellows [loc. cit.] on insect transmission to limes, though it tended to lose this power after passing through *Afraegle*.

Knorr (L. C.), Malaguti (G.), & Serpa (D.). **Descubrimiento de la 'tristeza' de las Cítricas en Venezuela.** [Discovery of tristeza on Citrus in Venezuela.]—*Agron. trop., Maracay*, **10**, 1, pp. 3–12, 3 fig., 1960. [Engl. summ. 12 ref.]

The existence of tristeza virus, the presence of which was first suggested in 1949 [**29**, 208], has been confirmed by the Centro de Investigaciones agronómicas and the Facultad de Agronomía, Univ. Central de Venezuela, Maracay, after being detected in 'limon criollo' and Meyer lemon by transmission tests on W.I. lime. Similar symptoms in various sweet orange trees could not, however, be ascribed to tristeza which resembles more the mild Florida than the virulent Argentina form. *Toxoptera citricidus* is absent and the local aphids, *T. aurantii* and *Aphis spiraecola*, are inefficient vectors.

Bar-Akiva (A.). **Biochemical indications as a means of distinguishing between iron and manganese deficiency symptoms in Citrus plants.**—*Nature, Lond.*, **190**, 4776, pp. 647–648, 2 fig., 1961.

In nutrient culture at Nat. Univ. Inst. Agric., Rehovot-Beit-Dagan, Israel, Fe and Mn deficiency symptoms developed in different types of citrus seedlings after 3–6 months. The analysis of leaf samples by paper chromatography, especially during the stages at which visual symptoms might be confused, showed that degradation of sugars occurred with decreasing Fe, and that the appearance of some free pentose (determined colorimetrically by an orcinol test) was due to Mn deficiency. Peroxidase activity and chlorophyll *a*:*b* ratio were also useful indicators in evaluation of the symptoms. These methods are considered more definite than chemical analyses and diagnostic sprays.

Boisson (C.). **L'anthracnose du Caféier.** [Coffee anthracnose.]—*Rev. Mycol., Paris*, **25**, 5, pp. 263–292, 4 graphs, 1960. [127 ref.]

A full and interesting review of coffee anthracnose (*Glomerella cingulata*) [see below], covering geographical distribution and economic importance; symptoms and damage caused; etiology; biology (including the presence of various strs, mechanism of infection and factors affecting it, transmission, latent infection, and host reaction); ecology; and control. The references extend to 1958.

Foucart (G.). **'Shedding' et 'Coffee berry disease' du Caféier d'Arabie.** ['Shedding' and 'Coffee berry disease' of Arabian Coffee.]—*Parasitica*, **17**, 1, pp. 22–28, 1961.

Studies at the Inst. National pour l'Étude Agronomique du Congo since 1956 are

summarized. Isolations of *Colletotrichum coffeanum* [*Glomerella cingulata*: cf. **40**, 361] from various parts of Arabica coffee bushes produced a range of cultural types distinguished by their cultural and morphological characters and pathogenicity. In nature 3 types of berry infection were found: active lesions, slowly developing scabs, and latent infections with no external symptoms. The 2nd and 3rd could change to the 1st under suitable conditions. Cultures from the first 2 were dull green and without acervuli, from the last and once from the 2nd, white with pink zones bearing acervuli. The green cultures were relatively stable at first but tended to change to the white after 8 months. Rayner's suggestion of continuous variation between extremes [**27**, 280] is interpreted as only an appearance due to the cultural form characteristic of latency giving rise to a semi-permanent mutant, which reverts to a form similar to the original by stepped variation. It is suggested that the fungus is able to develop on various organs of the plant and that its morphology, both there and in culture, and development are conditioned by the composition of the tissues on which it grows. It can remain latent in lesions or in apparently unaffected tissues, but becomes active if the substrate becomes more favourable and then anthracnose symptoms appear.

Observations on crop losses drew attention to the incidence of severe berry shedding. As *G. cingulata* was isolated from a high proportion of shed berries and shedding followed inoculation, it was thought to be the cause. However, no relation was detected between the incidence of lesions and the percentage or rate of shedding either with natural infection or inoculation. Systematic inoculation disclosed a marked variation in susceptibility with season and age of berries, which corresponded to the degree of shedding. It is concluded that shedding is not caused by the fungus, their coincidence being due to ecological factors. Berries 4–5 months old were most affected by shedding and its degree depended on crop size, radiation intensity, and rate of increase in berry fresh weight. The effects of the fungus are thus confined to bean destruction and berry drying before natural shedding causes considerably greater losses than bean destruction. In one locality coffee clones from which there is little shedding may be least attacked by anthracnose, but in another they may be the most susceptible to both.

Control treatments have so far not been very effective and a trial of substances inducing a temporary increase in photosynthetic activity is suggested.

Babaev (F. A.) & Bagirov (M. M.). Роль дубильных веществ в устойчивости Хлопчатника к вилту. [The role of tannin substances in resistance of Cotton to wilt.] —Хлопководство [*Khlopkovodstvo*], **11**, 5, pp. 20–22, 1961.

In studies at the Azerbaijan sci. Res. Inst. for Plant Protect. with 6 medium and 2 long staple cotton vars. inoculum of *Verticillium dahliae* [**40**, 308, 467] on rice was introduced into the seed holes before sowing at 3 different times. The accumulation of tannins in infected and healthy plants was determined by the Neubauer-Lövental method from water extracts of separate sections of the wood of the main stem, 10–12 cm. from the root collar. Large quantities were produced in response to fungal penetration. Tannins play a protective role against *V. dahliae* and do not cause disease symptoms.

Nazirov (N. N.) & Zapruder (E. G.). Физико-химические свойства биоколлоидов и устойчивость Хлопчатника к вилту. [The physical and chemical characters of the biocolloids and the resistance of Cotton to wilt.]

Nazirov (N. N.). Роль надземной части и корневой системы в вилтоустойчивости Хлопчатника. [The role of the aerial part and the root system in the resistance of Cotton to wilt.]—Докл. Акад. Наук Узб. ССР [*Dokl. Akad. Nauk Uzb. S.S.R.*], *1960*, 5, pp. 52–55, 1 diag.; 6, pp. 44–47, 4 fig., 1960. [Uzb. summ.]

At the Inst. Genetics and Plant Physiol., Acad. Sci. Uzbek S.S.R., in 1959 pot

plants of the resistant 152-F and the susceptible 1306-DV vars. of *Gossypium hirsutum* were soil inoculated with *Verticillium dahliae* [see above] on barley seed (20 g. seed 8 kg. air-dried soil per pot). Analyses of the 4–5th top leaves of the main stem showed that the viscosity of the protoplasm in symptomless 152-F leaves had hardly changed, but in 1306-DV it had increased considerably. When symptoms appeared, protoplasmic viscosity and elasticity decreased considerably in both vars., especially in 1306-DV. Infection by *V. dahliae* is accompanied by substantial changes in several of the most important physical and chemical properties of the biocolloids of the protoplasm as well as in the hydrophilic nature of the leaf colloids.

The same vars. were used in another series of experiments in 1959 with the same proportion of *V. dahliae* (Ferghana str.) inoculum vessel plant. They were grafted to plants of the same age by the 'ligule' method at the 4–5 true leaf stage. Root stock and scion selfed as well as non-grafted plants of 152-F were relatively mildly infected, but 1306-DV plants were severely infected and most died. With 152-F grafted to 1306-DV the resistant scion was fairly severely infected at fruiting and the negative effect of *V. dahliae* on the development of the root system of the susceptible root stock was reduced. With 1306-DV grafted to 152-F the susceptible scion was little affected and bore fruit more or less normally; the roots were somewhat more susceptible. It was concluded that the root system plays a major role in resistance. There appears to be a substance in the roots of the more resistant cotton vars. which blocks the toxic metabolites of *V. dahliae* and makes the plant resistant. Roots of susceptible vars. appear unable to synthesize this substance.

Selby (K.). **The degradation of Cotton cellulose by the extracellular cellulase of Myrothecium verrucaria.** —*Biochem. J.*, **79**, 3, pp. 562–566, 2 graphs, 1961.

From tests at the Shirley Inst., Manchester, in which *M. verrucaria* [cf. **39**, 668] extracts were used on unmercerized and mercerized cotton cellulose, it was concluded that the enzyme, composed as it is of large molecules with restricted mobility in the substrate, removes adjacent glucose residues from each site of attack.

Pietkiewicz (T.) & Czyżewska (Sabina). **Wpływ zaprawiania nasion na infekcję Lnu przez grzyby z rodzaju Fusarium.** [Effect of seed treatment on the infection of Flax by fungi of the genus *F.*] —*Prace nauk. Inst. Ochr. Rośl., Poznań*, **2**, 2, pp. 35–79, 30 graphs, 1960. [Russ., Engl. summ. 60 ref.]

At Inst. Plant Prot., Reguły, Poland, organo-mercurials and thiram did not completely eliminate seed-borne infection by *F.* spp. [cf. **38**, 600] or protect the seed effectively against soil-borne infection. The date of sowing was relevant, *F.* incidence depending largely on temp.

Martin (A. L. D.), Frederiksen (R. A.), & Westdal (P. H.). **Aster yellows resistance in Flax.** —*Canad. J. Pl. Sci.*, **41**, 2, pp. 316–319, 3 fig., 1961.

Selection at the Canada Dept Agric., Winnipeg, Man. [cf. **40**, 610], of Abyssinian (C.I. 302) flax for 5 generations produced a line with higher resistance to aster yellows virus and suitable for a breeding programme.

Vallega (J.) & Antonelli (E. F.). **Variaciones en la población parásita de la roya del Lino en la Argentina.** [Variations in the parasite population of Flax rust in Argentina.]—*Rev. Invest. agríc., B. Aires*, **14**, 4, pp. 403–420, 2 maps, 2 graphs, 1960. [18 ref.]

At the Inst. de Fitotécnica, Buenos Aires, none of the races of *Melampsora lini* [**29**, 354; **38**, 520] present in former years (viz. 19, 20, 22, 40 and 42) could be detected; the new ones found did not attack Williston Golden (C.I. 25). The most important new race was 267, capable of attacking Bombay (C.I. 42). The

differentials used were Bombay, Ottawa 770 B, Stewart, Cass, Wilden, Bisbee, Grant, Minnesota, Burke, and the commercially grown Pergamino Pampa. In 1957–8 14 races, Arg. 1–14, of which Arg. 4 was the most widely distributed, were isolated. Earmarked for further study are the Pergamino vars. Flandes, Calchaquí (7031), and 6879, and Kugler C and D.I.V. 9756, all immune from the 1957–8 isolates. Of the linseed vars. none was resistant to Arg. 14 except the Pergamino line aH 827 F_4-68.

Pietkiewicz (T. A.) & Zarzycka (Hanna). **Rdza lnowa Melampsora lini (Pers.) Lév. z badań nad rdzą lnową (Melampsora lini (Pers.) Lév.).** [Some investigations on Flax rust, *M. lini*.]—*Roczn. Nauk rol.*, Ser. A, **81**, 1, pp. 229–251, 1960. [Russ., Engl. summ. 46 ref.]

Investigations at the Inst. of Plant Protect., Reguły, Poland, showed rust [**40**, 170] to be widespread in all flax areas. Vars. in a rust nursery were inoculated with mixtures of rust collections from various areas; 52 vars. remained uninfected, 9 of them during 2 seasons, and Swietocz during 3, but none were native. Stem resistance was shown in 1956 in 17 vars., and also Gerda, Holandia, Sorauer Lusatia, already grown in Poland, though the widely-grown Concurrent is susceptible. The linseed vars. Armenian, K 401, and Wojnestr have resistant leaves and sepals, stems only being slightly affected.

Imam Fazli (S. F.) & Ahmed (Q. A.). **Fungus organisms associated with Jute seeds and their effect on germinating seeds and seedlings.** Reprinted from *Agric. Pakist.*, **3**, 11, 14 pp., 4 fig., 2 graphs, 1960. [12 ref.]

At the Jute Res. Inst., Tejgaon, Dacca, E. Pakistan, 22 collections of jute seeds from various districts of the province were studied and 27 spp. of fungi (listed) were isolated [cf. **38**, 601], including *Macrophomina phaseoli* [**40**, 470]. *Diplodia corchori* [cf. **40**, 109], and the harmful moulds *Aspergillus flavus*, *A. fumigatus*, *A. niger*, and *Curvularia lunata*. Seed stored at moisture levels of 10, 15, and 20% for 28 days and treated with agrosan GN showed higher germination (94, 72, and 52%, respectively) and seedling vigour (81, 21, and 10%, respectively) than untreated (90, 48, and 10; 78, 0, and 0).

Rahman (N.) & Ahmed (Q. A.). **Antagonistic activity of a Streptomyces species against the pathogens causing seedling blight of Jute, Corchorus capsularis L.**—*Pakist. J. biol. agric. Sci.*, **2**, 1, pp. 7–16, 1 pl., 1959. [14 ref.]

At the Dept Bot., Univ. Dacca, E. Pakistan, *Streptomyces* sp. (X 3) was found to arrest strongly the growth of *Macrophomina phaseoli* [cf. above], *Glomerella cingulata*, and *Colletotrichum corchori* [loc. cit.] on potato dextrose agar, on which all 4 organisms showed max. growth at pH 6–7. *C. corchori* is the most sensitive of the 3 and its incidence was reduced by 40–50% in greenhouse soil-pot tests by cultures and culture filtrates of the antagonist.

Ferri (F.). **Microflora dei semi di Canapa.** [The microflora of Hemp seed.]—*Progr. agric.*, **7**, 3, pp. 349–356, 1 pl., 7 fig., 1961.

After discussing the dying-off of young hemp seedlings in Italy associated with various animal and plant parasites and unfavourable environmental conditions [cf. **31**, 184; **35**, 766 *et passim*] the author gives a full account of work at Univ. Bologna on the isolation of fungi from the outer and inner tissues of 5 vars. of hemp seed, the results of which are listed. A table is also given showing the chemicals used in seed treatments, with the conc. and the time required to give effective protection. It is concluded that of the many spp. of fungi present on and in hemp seed only a few are able adversely to affect the viability of seedlings (if growing in opt. conditions) during pre- or post-emergence.

Zelenay (A.). **Fungi of the genus Fusarium occurring on seeds and seedlings of Hemp and their pathogenicity.**—Engl. abs. in *Prace nauk. Inst. Ochr. Rośl., Poznań*, **2**, 2, pp. 248–249, 1960.

From hemp seed samples from different parts of Poland, examined at the Inst. Plant Prot., Poznań, *F. oxysporum*, *F. avenaceum* var. *herbarum*, and *F. javanicum* var. *radicicola* and its f. 1 were identified. *F. oxysporum* was most and *F. javanicum* the least pathogenic to hemp seed and seedlings both *in vitro* and *in vivo*. *F. avenaceum* var. *herbarum* was highly pathogenic in the lab., but less so in the field or greenhouse.

Bollow (H.). **Welcher Schädling ist das? Schädlinge und Krankheiten an Zierpflanzen.** [Which pest is this? Pests and diseases of ornamentals.]—234 pp., 8 col. pl., 432 fig., Stuttgart, Kosmos, Gesellschaft der Naturfreunde, Franckh'sche Verlagshandlung, 1960. DM 16.80 (Kosmos members DM 14.80).

This popular, practical manual contains tabulated notes on symptoms, characteristics of the pest, fungus, or virus, and control measures. Diseases and pests common to many plants are dealt with first, followed by those on individual hosts arranged alphabetically. There are indexes (Latin and common names) to the 3 types of agent and to hosts, and a compilation of the most useful plant protection materials and measures.

Weil (B.). **Zierpflanzen als symptomlose Träger des Tabakmosaik-Virus.** [Ornamental plants as symptomless carriers of Tobacco mosaic virus.]—*Phytopath. Z.*, **41**, 2, pp. 145–150, 1961. [Engl. summ.]

At the Inst. für Pflanzenkrankheiten und Pflanzenschutz der Technischen Hochschule, Hanover, latent systemic infection was found in *Amaranthus tricolor*, *Cleome spinosa*, *Gypsophila elegans*, *Kochia scoparia*, *Calendula officinalis*, China aster, sunflower, *Tagetes patula*, *Zinnia elegans*, *Iberis umbellata*, *Antirrhinum majus*, and *Linaria maroccana*, whereas Holmes [cf. **26**, 32] found local masked infection in these spp. *Salpiglossis sinuata*, *Nierembergia hippomanica*, and *Phlox drummondii* were latent virus carriers; Holmes described clear symptoms on the leaves developing after infection.

Newly established as latent carriers were *Mesembryanthemum criniflorum*, *Celosia plumosa*, *Lobelia erinus*, *Centaurea cyanus*, *C. imperialis*, *Chrysanthemum spectabile*, *Helianthus cucumerifolius*, *Ipomoea purpurea*, *Malcolmia maritima*, *Scabiosa maritima*, *Euphorbia marginata*, *Phacelia tanacetifolia*, *Dracocephalum moldavica*, *Eschscholtzia californica*, *Gilia rubra*, *Delphinium ajacis*, *Reseda odorata*, *Pentstemon gentianoides*, and *Physalis franchetti*.

Agarwal (G. P.) & Ganguli (Miss S.). **Nitrogen and sulphur requirements of Pestalotiopsis versicolor (Speg.) Steyaert.**—*Phyton, Vicente López*, **14**, 2, pp. 159–165, 1960.

In further studies on *P. versicolor* from *Anogeissus latifolia* in India [**39**, 109] dry wt. and sporulation were best with KNO_3 and $NaNO_3$ as N sources while $MgSO_4$ was the best S compound tested.

Thompson (H. S.). **Control of powdery mildew on tuberous Begonia in Canada.**—*Canad. J. Pl. Sci.*, **41**, 2, pp. 227–230, 1961.

Of 6 chemicals tested at Canada Dept Agric., Ottawa, Ont., from 1955–57, karathane WD at 6 or 8 oz./80 imperial gals water, applied 3 times at 3-day or weekly intervals, eradicated mildew (*Erysiphe cichoracearum*) [cf. **38**, 387]), but with a slight bleaching of the petal edges. Karathane dust (2%) and actidione at 1 and 2 p.p.m. also gave a 100% control, while captan 50 W, fermate+S, and omazene were only fungistatic. A spreader-sticker, orvus, was added to each spray at 5·5 oz./gal.

Gill (D. L.). **Use of water-emulsifiable asphalt with fungicides to protect Camellia grafts.**—*Plant Dis. Reptr*, **45**, 6, pp. 432–434, 1961.

At Dept Agric., Tifton, Ga, a covering of this mixture on graft wound surfaces on *C. japonica* scions and stocks inoculated with *Glomerella cingulata* [cf. **33**, 482] increased the number of takes over no treatment or fungicides without asphalt; grafts not inoculated with *G. cingulata* were not improved by the addition of asphalt.

Reiter (Liselotte). **Viruskristalle in Nelken.** [Virus crystals in Carnations.]—*Protoplasma*, **53**, 2, pp. 149–161, 11 fig., 1960. [31 ref.]

The author (Inst. für Anatomie und Physiologie, Univ. Graz, Austria) points out that internal changes, such as the appearance of cell inclusions [**39**, 711], are more important for the detection of virus infection in carnations than external symptoms, which may be slight or absent. Amorphous X-particles and various crystalline inclusions, particularly hexagonal and tetrahedral, were constantly found in affected plants and their virus nature was ascertained by transmission. The time of the appearance of symptoms suggested that the viruses, transmitted mechanically to carnation, *Dianthus barbatus*, and *Chenopodium album*, but not to *Nicotiana glutinosa*, were carnation mosaic or carnation mottle.

Zachos (D. G.), Constantinou (P. T.), & Panagopoulos (C. G.). **Une trachéomycose du Chrysanthème causée par une nouvelle espèce de Cephalosporium.** [A tracheomycosis of Chrysanthemum caused by a new species of *C.*]—*Ann. Inst. phytopath. Benaki*, N.S., **3**, 2, pp. 50–59, 8 fig., 1 graph, 1960.

This new disease, observed near Athens in 1956, is described. Chlorosis of the leaves, which eventually dry, pink, longitudinal, linear necroses on the stem, later turning reddish brown, and a pink discoloration of the vessels containing the hyphae and spores are the symptoms. The pathogen is named *C. chrysanthemi*: the primary conidia measure 2·1–5·4 (3·1±0·6)×0·8–1·9 (1·4–0·2) μ, and the secondary 2·7–5·4 (3·6±0·6)×1·1–1·8 (1·45±0·13) μ. Opt. growth is at 25–27° C. The vars. Kremaki tardif and Boule de Neige proved susceptible.

Mildner (R. A.) & Scheffer (R. P.). **Host ranges and properties of some viruses from Dahlia.**—*Phytopathology*, **51**, 6, pp. 372–376, 3 fig., 1961.

Further details from Mich. State Univ., East Lansing, of studies noticed in part [**39**, 174]. Of the 5 isolates, 1 and 3 caused ring spots on dahlia seedlings, the others non-distinctive symptoms. Isolates 1 and 5 were finally regarded as strs. of tomato spotted wilt virus, though showing minor differences. Since isolate 3 differed from 1 and 5 and from other known viruses, Brierley's designation 'dahlia ring spot' [**12**, 697] should be retained. The 2 remaining isolates were unidentified. The physical properties of the isolates are detailed.

Cejp (K.). **Houbové choroby Jiřin v ČSSR.** [Fungus diseases of Dahlias in Czechoslovakia.]—*Čes. Mykol.*, **15**, 3, pp. 169–179, 7 fig., 1961. [47 ref.]

This review notes, *inter alia*, *Pythium acanthicum* on overwintering bulbs in warm cellars, *P. ultimum* [map 207] and *P. debaryanum* causing the damping-off and black leg of young seedlings, and *Erysiphe polyphaga* [*E. cichoracearum*], *Entyloma dahliae*, and *Ascochyta dahliicola*.

Forsberg (J. L.). **Hot-water and chemical treatment of Illinois-grown Gladiolus cormels.**—*Biol. Notes, Urbana*, 43, 12 pp., 3 fig., 5 graphs, 1961.

With 30 min. hot water treatment [**37**, 482] the temp. necessary to destroy *Fusarium oxysporum* f. *gladioli* completely ranged from 130–143° F. according to the isolate. All the *Curvularia trifolii* f. *gladioli* [**37**, 702] isolates were killed at 132–

134°, and all 3 *Stromatinia* [*Sclerotinia*] *gladioli* at 124°. It is concluded that the hot water treatment can sometimes be used beneficially but chemical treatment will yield more rot-free corms. The safest time to use hot water is in Jan., but the cormels should previously be kept under warm, dry conditions for at least 1 month. As all *F.* isolates are not killed in 30 min. at 135°, Corona and Leading Lady cormels were treated in 1960 in Fla at temps. up to 139°, though regular use of this method would be unwise, as it reduces germination.

THOMPSON (H. S.). **Corm treatments for the control of Curvularia corm rot of Gladiolus in Canada.** —*Canad. J. Pl. Sci.*, **41**, 2, pp. 268–271, 1961.

Of 8 fungicides used at Canada Dept Agric., Ottawa, Ont., for the treatment of gladiolus corms to be planted in plots artificially infested with *C. trifolii* f. sp. *gladioli* [cf. above] delsan A–D, arasan SF-M, and arasan SF-X (dusts) significantly reduced the percentage of affected plants and increased stand, corm yield, and the number of healthy corms. Delsan A-D delayed emergence by 6 days and all delayed flowering by 4–5 days.

ENDO (R. M.). **A mosaic disease Hibbertia volubilis.**—*Phytopathology*, **51**, 6, pp. 402–406, 4 fig., 1961.

Further details from Univ. Calif., Los Angeles, of studies on this disease caused by cucumber mosaic virus [**40**, 171].

ELLIOTT (E. S.), DAVIS (C. J.), & HOWARD (C. M.). **Iris leaf spot control.**—*Plant Dis. Reptr*, **45**, 6, pp. 470–471, 1961.

Iris leaf spot caused by *Didymellina* [*Mycosphaerella*] *macrospora* [**38**, 698] was found at the W. Va Univ., Morgantown, to be controlled equally well with zineb, maneb, or phaltan. In N.W. Va the fungus overwinters in the conidial state, renewed growth and sporulation on infected dead leaves providing primary inoculum in the spring. Wild garlic (*Allium vineale*) is attacked also by a *Heterosporium* similar to conidial *M. macrospora* and may be a source of infection.

GÄUMANN (E.). **Nouvelles données sur les réactions chimiques de défense chez les Orchidées.** [New data on the chemical defence reactions of Orchids.] —*C.R. Acad. Sci., Paris*, **250**, pp. 1944–1947, 3 graphs, 1960.

Further laboratory studies demonstrated that in *Orchis militaris* bulbs placed in contact with *Rhizoctonia repens* synthesis of orchinol (or chemical defence against the agent of infection) began after 36 hr. [**40**, 111]. The max. conc. of orchinol (920 μg. g. fresh tissue) was found after 8 days in that part of the bulb in direct contact with the mycelium. The defence reaction of the bulb was shown to be not merely a localized response of tissues directly threatened by the infectious agent, but a reaction of the whole bulb.

BATEMAN (D. F.). **Environment and the Poinsettia root rots.**—*Bull. N.Y. St. Flower Grs* 186, pp. 1–4, 3 graphs, 1961.

At the Dept Plant Path., Cornell Univ., Ithaca, N.Y., cuttings of Barbara Ecke Supreme poinsettia [*Euphorbia pulcherrima*] were rooted under intermittent mist at 3 soil temp., 3 soil moisture levels, and 3 soil pH levels in all possible combinations with 3 pathogens. Cultures were fragmented in a Waring Blendor and were mixed thoroughly with the soil before inserting healthy rooted cuttings or were injected (hypodermically) into the soil after the plants were established. Disease severity was rated 0–5 (entire root system destroyed). Soil pH below 5·3 reduced root rot severity incited by *Thielaviopsis basicola* [**40**, 157] and *Pythium ultimum* [**39**, 316]. Temp. below 71° F. had a controlling influence on *Rhizoctonia* [*Corticium*] *solani*. *Pythium* root rot was reduced with low soil moisture regardless of the levels of the

other 2 factors. Of 216 associations of environmental factors and pathogens, a combination of low soil pH (4–5·3), low soil moisture (below 45% moisture holding capacity), and low soil temp. (about 65°) gave min. disease, regardless of the pathogen or combination of pathogens present.

Rubin (H. L.). **Poinsettia scab—a new report for Puerto Rico.**—*Plant Dis. Reptr*, **45**, 5, p. 375, 1 fig., 1961.

A heavy infection of *Sphaceloma poinsettiae* [**39**, 79] on *Euphorbia pulcherrima* is reported from Rio Piedras Exp. Sta., P.R.

Gualaccini (F.). **Ulteriori osservazioni sul 'mosaico giallo' della Rosa.** [Further observation on 'yellow mosaic' of Rose.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, **18**, 1, pp. 49–64, 5 pl. (1 col., 23 fig.), 1960. [Engl. summ. 25 ref.]

In further studies on the virus disease of rose trees characterized by yellow markings on the leaves [**37**, 665; **40**, 226] budding and chip-budding transmitted the disease from Paul's Scarlet Climber to Gioia rose [cf. **39**, 231]. On the shoots from the buds and from the budded plants symptoms resembling those of the original condition appeared after 14 months; the leaves of the inoculated plants also had chlorotic veins with round spots or the spots were scattered over most of the leaf surface. Inoculations to myrobalan plum induced various types of pale green or chlorotic leaf spots, as well as ring spots not very different from those produced on myrobalan by 'line-pattern' virus on apricot [**40**, 370], and on Reale d'Imola apricot similar symptoms reminiscent also of mosaic virus on apricot and those produced by cherry line-pattern virus [**40**, 697].

From the evidence so far obtained the author concludes that the virus is related to the virus complex causing apricot and cherry line-pattern though differing somewhat from it; it is probably a str. of the complex.

No particles could be detected in infected sap by the electron microscope.

Henneberry (R. J.), Taylor (E. A.), Smith (F. F.), Boswell (A. L.), & Travis (R. V.). **Combination acaricide-insecticide-fungicide sprays on outdoor Roses.**—*J. econ. Ent.*, **54**, 3, pp. 420–422, 1 graph, 1961.

In further studies at Beltsville, Md [cf. **40**, 540], adequate control (80%) of black spot (*Diplocarpon rosae*) on 3 vars. was given by maneb, followed by zineb, ferbam, and captan in order of decreasing effectiveness. The acaricide-fungicide combinations (all with an insecticide and a wetter) were compatible and no plant injury was observed. Mite (*Tetranychus telarius*) populations on fungicide check plots were correlated with black spot injury, plants with the least defoliation and chlorosis having the highest populations.

Jones (B. M.) & Swartwout (H. G.). **Systemic control of powdery mildew of Roses (Sphaerotheca pannosa) with the semicarbazone derivative of acti-dione.**—*Plant Dis. Reptr*, **45**, 5, pp. 366–367, 1961.

At Mo. agric. Exp. Sta, Columbia, young own-root Snow White roses in 6″ pots were soil drenched with the semicarbazone derivative and 3 days later inoculated with powdery mildew [cf. **39**, 587]. The tabulated results show that partial control was obtained at 2·5, 5, and 10 p.p.m. and complete control at 20–100 p.p.m., 4 mg./plant of actidione semicarbazone being required: no phytotoxicity was observed.

Liu (S. C. Y.) & Silberschmidt (K. M.). **Heat-induced susceptibility of Tobacco to Tropaeolum mosaic virus.**—*Phytopathology*, **51**, 6, pp. 413–415, 1 fig., 1 graph, 1961.

At Inst. Biológico, São Paulo, Brazil, more lesions were obtained on half leaves of

White Burley tobacco treated with hot water at 40–50° C. [cf. **37**, 341] and inoculated with *Tropaeolum* mosaic virus [**33**, 84] than on the unheated halves, though the lesions on both were of the same size. Variants of the virus not normally producing visible lesions on White Burley did so on leaves treated with hot water before or after inoculation.

Jackson (N.). **Turf disease notes, 1960.**—*J. Sports Turf. Res. Inst.*, **10** (*1960*), 36, pp. 171–175, 1961.

On the experiment ground of the Sports Turf Res. Inst., Bingley, Yorks., natural infections of *Fusarium* patch disease [*Calonectria nivalis*: **39**, 588] appeared in Aug. on areas heavily fertilized with N, including the site of an earlier experiment [**37**, 591], and increased steadily on the plots without fungicide. Verdasan gave good protection even with a 5-week spraying interval (27 Sept.–7 Nov.). Cadmium chloride urea at 4 ml. 250 ml. water 25 sq. ft. was less satisfactory over a similar period, but used at intervals of 3–4 weeks it is a cheap and effective preventive [cf. **40**, 542]. Good results were also obtained with mersil (2 g.) and merfusan.

In another trial plots were sprayed on 26 Aug. when active infection was moderately uniform. The initial application of the Hg fungicides kramsol (4 g./250 ml. water 25 sq. ft.), mersil, Fusarium specific (158 g. dry), and PP. liquid mercury plus (0·7 ml.) checked further spread by 26 Sept. (2nd application), and on 10 Nov. control was still good. The last-named caused marked yellowing.

From July onwards the wet weather favoured numerous outbreaks of *Corticium* [*fuciforme*]; as a result of mild conditions, the disease persisted late into the winter and was still present in Feb. 1961. Dollar spot [*Sclerotinia homoeocarpa*] was active in the late autumn of 1959, and small spot symptoms persisted throughout the winter. Infection was renewed in the spring and reached a peak in late July.

In Sept.–Oct. serious outbreaks of *Ophiobolus* patch [*O. graminis* var. *avenae*] occurred in many parts of the British Isles and remained active late in the yr. Perithecia were abundant and it seems likely that if 1961 is wet the disease will cause more trouble, especially on *Agrostis* turf of high pH or recently limed [**38**, 604].

Dirven (J. G. P.) & Van Hoof (H. A.). **A destructive virus disease of Pangola-grass.** –*Tijdschr. PlZiekt.*, **66**, 6, pp. 344–349, 3 fig., 1960. [Dutch summ.]

Pangola grass (*Digitaria decumbens*), introduced into Surinam in 1951 from Florida and planted extensively for pasture, has been troubled by *Mycosphaerella tassiana* and, since 1958, by a dying-off, which is described and is attributed to a virus. The 1st symptom of the latter is a slower recovery after mowing or grazing, with the resultant establishment of other grasses and weeds. The diseased plants do not form runners and are easily torn off at soil level. Disease spread is slow, but even moderate infection can depress yields by 50% or more. Stunting occurs and the length of the internodes falls to 1 cm., while abnormal branching leads to tuftiness. The youngest leaf emerges curved and turns dark yellow, while parts often appear greenish-yellow with pale red tips. Of 2 forms of *Digitaria pentzii* imported from Trinidad, S.R. 924 proved susceptible, S.R. 908 resistant; *Brachiaria brizantha* and *B. decumbens* appear resistant. It seems probable that in Surinam the virus has natural hosts. It is transmitted by the delphacid *Sogata furcifera*.

Slykhuis (J. T.). **Eriophyid mites in relation to the spread of grass viruses in Ontario.**—*Canad. J. Pl. Sci.*, **41**, 2, pp. 304–308, 1961.

At Canada Dept Agric., Ottawa, Ont., *Aceria tulipae*, *Abacarus hystrix*, and *Vasates mckenziei*, common on wheat and *Agropyron repens* naturally infected by agropyron mosaic virus [**40**, 351], did not prove to be vectors, though *Aceria tulipae* produced a mild chlorotic mottle of wheat similar to the symptoms of mild strs.

of wheat spot mosaic virus [**36**, 389] in Alta; mites reared from eggs on healthy wheat did not produce this mottle. Wheat streak mosaic virus [**40**, 458], not found in Ont., was transmitted by *A. tulipae* from Ont. and Alta.

Dubinevich (B. N.). О болезнях Гречихи. [Diseases of Buckwheat.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 6, pp. 25–26, 1961.

Downy mildew [*Peronospora ducometii*: cf. **12**, 550] and grey mould [*Botrytis cinerea*: **40**, 312] are reported by the Selection Sta., Starchenkovskiĭ district, U.S.S.R., to be the most serious diseases of buckwheat in the Kiev areas. The mildew spread rapidly and attacked up to 50% of the leaves and 14–72% of the flowers by the end of June, causing them to damp off. Grey mould occurred mostly after sugar beet and other root crops, the mycelium and sclerotia which had overwintered on debris acting as the source of infection. The information on seed treatment has been noticed [**33**, 669].

Chevalier (Mme L.). **Comportement du Cynodon dactylon vis-à-vis d'un parasite Ustilago cynodontis (Pass.) P. Henn.** [Behaviour of *C. dactylon* towards the parasite *U. cynodontis*.]—*Naturalia monspel.*, Sér. bot., *1960*, 12, pp. 3–12, 4 fig., 1960. [35 ref.]

A report is presented from Univ. Montpellier, France, on the studies of the parasite [cf. **36**, 555] in field plants. In the vegetative phase of host development the fungus remained in the apical meristem without pathogenic effects. With the beginning of floral differentiation the mycelium attacked the meristem and invaded the inflorescence, which it finally destroyed, with the production of chlamydospores.

Papavizas (G. C.) & Davey (C. B.). **Extent and nature of the rhizosphere of Lupinus.**—*Plant & Soil*, **14**, 3, pp. 215–236, 2 pl., 3 diag., 1961. [27 ref.]

At Crops Res. Div., Beltsville, Md, the highest number of micro-organisms in unamended soils was obtained from the rhizoplane and the lowest from soil 80 mm. from the roots of *Lupinus angustifolius* (blue lupin) 18 days after planting. From the root surface outward the rhizosphere effect was very clear to 3 mm. and still evident at 18 mm.; some fungi are preferentially encouraged by the roots. Soils amended with plant materials stimulated fungi more than those given only N, the former reducing the rhizosphere/soil ratios of fungi, a definite rhizosphere effect still being observed on considering individual spp. Corn stover of small particle size added to Elsinboro sandy loam accompanied the highest total fungus counts, its effect being altered by addition or not of N and varied with the spp. Changes in the numbers and kinds of fungi on seedling root surfaces were caused by barley straw, corn stover, soybean meal, and N added 28 days before planting. *Cephalosporium*, *Sporotrichum*, *Verticillium*, and 2 sterile fungi were stimulated by all plant matter, especially by the 2nd and 3rd, the latter reducing *Fusarium* [**39**, 76] in the soil and rhizosphere, but not on the root surface.

Kilpatrick (R. A.). **Green Tomato fruits—a medium for inducing fruit rot and asexual sporulation with fungi isolated from Clovers.**—*Plant Dis. Reptr*, **45**, 5, pp. 341–343, 4 fig., 1961.

At N. Hamp. agric. Exp. Sta., Durham, isolates of *Cladosporium* sp., *Fusarium oxysporum*, *F. roseum*, *F. solani*, and *Gliocladium roseum* from Ladino white and red clovers induced severe rotting in green tomatoes [cf. **39**, 626] inoculated by toothpick and hypodermic needle, while *Curvularia trifolii* [**38**, 149] and *Trichoderma* sp. induced milder rotting. Macroconidia of *Fusarium* spp. developed abundantly on inoculated fruits, but none of the other fungi sporulated or developed the perfect state.

Leach (C. M.), Dickason (E. A.), & Gross (A. E.). **Effects of insecticides on insects and pathogenic fungi associated with Alsike Clover roots.**—*J. econ. Ent.*, **54**, 3, pp. 543–546, 1 fig., 1961.

In field investigations by Ore. State Coll., Corvallis, and Ore. agric. Exp. Sta., Klamath Falls, on the relationship between injury by the alsike clover root curculio (*Sitona hispidula*) and the incidence of pathogenic fungi, those most frequently isolated were *Fusarium oxysporum* [cf. **40**, 53], *Verticillium alboatrum*, and a *Phoma* sp., all of which were pathogenic, but only *F.* spp. were assisted in host penetration by insect wounds.

Gibbs (A. J.) & Tinsley (T. W.). **Lucerne mosaic virus in Great Britain.**—*Plant Path.*, **10**, 2, pp. 61–62, 1 pl., 1961.

Further details are given from Rothamsted exp. Sta. [**40**, 2]. The virus is also widespread in crops of white and red clover. Isolates from lucerne fall into 2 groups, depending on whether or not they cause systemic symptoms in Prince French beans (*Phaseolus vulgaris*): only 9 of 537 isolates from England [**40**, 266], Scotland, and Wales did so. Naturally infected Du Puits lucerne plants were mostly stunted, with faintly mottled and striped leaves, which were occasionally distorted. Symptoms almost disappeared in hot weather; on white and red clover they were similar but less severe. Affected Russell hybrid lupins were stunted and the leaves had a chlorotic mottle. The symptoms on 7 spp. of inoculated plants are also described.

In sap from infected tobacco plants the virus became inactivated in 4–20 days at 18° C., though it was still infective after 100 days at −10°. It was inactivated after 10 min. at 65°, but not at 60°. It was transmitted by *Acyrthosiphon pisum* after the insect had been starved for 1 hr. and then given an infection feed of 5 min.

Heim (Panca). **Observations sur l'évolution de l'Urophlyctis alfalfae (Lagh.) Magn.** [Observations on the development of *Physoderma alfalfae*.]—*Rev. Mycol., Paris*, **26**, 1, pp. 3–23, 1 pl. (24 fig.), 12 fig., 1961. [59 ref.]

Studies at the Laboratoire de Biologie végétale de la Sorbonne, Paris, showed that the life cycle of *P. alfalfae* [cf. **30**, 125] takes place entirely within the host cells, which become hypertrophied. The active proliferation of the parasite causes the complete destruction of the cells, and this results in the formation of irregular cavities filled with the organs of the fungus. *P. alfalfae* is a very active parasite of the lucerne nucleus: this becomes hypertrophied and bursts, and its contents (chromatic or chromosome filaments), either already formed or in process of formation, are scattered about in the cavity. The cysts or resting organs are vegetative and do not produce zoospores, which develop in the sporangia at the end of the growing period. The sporangia are vesicles resembling cyst vesicles.

The zoospores, filaments, vesicles, and cysts are haploid, a phase of long duration and characterized by active growth and proliferation. The sporangia with their fusion nuclei represent the brief diploid phase, resumption of the haploid occurring with the 1st division of the germination nuclei.

McDonald (W. C.). **Note on a method of producing and storing inoculum of the Alfalfa black stem fungus, Ascochyta imperfecta Pk.**—*Canad. J. Pl. Sci.*, **41**, 2, pp. 447–448, 1961.

At the Canada Dept Agric., Winnipeg, Man., excellent infection was obtained by spraying heavy *A. imperfecta* [cf. **39**, 473] spore suspension + 0·25% gelatin on 1-month-old lucerne seedlings and incubating them in a moist chamber at 60–70° F. for 5 days. Of the whole grain media tested to provide inoculum [cf. **33**, 310] barley kernels inoculated with 10 ml. spore suspension and incubated at 70° for

3 weeks gave the richest *A. imperfecta* spore yield. After being used to provide a spore suspension the kernels were dried on paper towels over warm air, or frozen, and stored in a refrigerator, and could be used to produce spore suspensions again.

Rudakov (O. L.). Биометод уничтожения Повилики. [A bio-method for the destruction of Dodder.] –Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 6, pp. 23–24, 1961.

Dieback of dodder (*Alternaria cuscutacidae*) was studied at the Acad. of the Kirgiz S.S.R. and found to amount to 60-100% in lucerne, hemp, sugar beet, and mixed grass stands. In lucerne fields it began in May; dodder stems, affected usually at the ground level, withered and died. The sp. comprised numerous strs. varying in growth, incubation period, colour, and pathogenicity. A highly pathogenic str. was isolated and grew well on artificial media, though repeated sub-culturing rendered it ineffective. Pure cultures produced infection of dodder shoots, mature stems, flowers, and seeds, but were harmless to other plants. Sprays on patches of dodder in wet fields or meadows with a spore suspension induced visible symptoms of the disease in 7–8 days, though growth was inhibited earlier. In lucerne dodder [*Cuscuta cupulata*] some stems were killed 5–8 days and the whole clump 18–20 days after spraying, the protective influence lasting for 3 subsequent mowings. Generally, a better effect was obtained if the spores were suspended in an *Ailanthus* or sugar beet leaf extract rather than in water. *Alternaria cuscutacidae* cultures are now on sale.

Welsh (M. F.) & Keane (F. W. L.). **Diseases of Apple in British Columbia that are caused by viruses or have characteristics of virus diseases.**—*Canad. Pl. Dis. Surv.*, **41**, 3, pp. 123–147, 14 fig., 1961. [29 ref.]

These diseases are described from the Dept Agric. Res. Sta., Summerland, B.C., in 3 main groups: those affecting tree vigour or growth habit, the leaves, and the fruits, with concluding comments on the evidence of natural spread, and on economic importance. Some of the information has been noticed [**40**, 545]. They include stem pitting [loc. cit.; **39**, 178], rubbery wood [**39**, 535], decline of Virginia crab [**39**, 179], decline of Hyslop crab [**40**, 545], flat limb [**37**, 171], apple mosaic, leaf pucker [**40**, 544], dapple apple [**39**, 179], and flute fruit (dwarf fruit) [**40**, 113].

Others described are: 'mumps' on Winesap trees, in which bark tissue swells round pruning wounds and bases of lateral shoots, often accompanied by linear depressions between swellings, as in flat limb; bark blister on several Winesap trees, in which outer layers of bark tissue of trunk, scaffold branches, and smaller limbs to the 3-yr. old wood die, crack, and break into superficial scales; crab apple leaf flecking and necrosis, found in crabs propagated on E.M. II stocks, the symptoms varying with the var., but usually including leaf flecking and sometimes large necrotic areas in the leaf lamina, especially on first formed leaves in spring; chlorotic leaf spot, found on Russian seedling R 12740–7A [**39**, 179] after tissue union with many clones, the flecks being associated with veins and veinlets, accompanied by leaf puckering and dwarfing; McIntosh fruit pit and russet, found in the same orchards as leaf pucker, characterized by randomly distributed small, purple skin depressions, which may be due either to a single virus or one on the leaf and one on the fruit; Stayman fruit blotching, on all Staymans seen, present on large surface areas of skin which turn purple to brown; ring russetting [**40**, 545] of Newtown, and also of Delicious, with elaborate patterns on the fruit; dark scar of Newtown, with various symptoms, sometimes large black scars on half the skin on all fruits, or fruit dwarfing and distortion with large purple blotches or expanded scars; and sunken blotch, found in the Okanagan Valley, characterized by a dark purple to black depressed area on the fruit cheek underlaid by a shallow pocket of brown corky flesh.

Strong evidence suggests natural spread of stem pitting; fruit blotching and leaf pucker spread gradually from tree to tree, but there is no evidence for seed transmission of any of these diseases. Stem pitting has finally eliminated the use of Virginia crab as a hard body stock in the Province, ring russetting has affected a large percentage of Newtown trees, and 'mumps' has caused removal of uneconomic trees in Winesap orchards. In some of the diseases more than one virus may be involved or the same virus may be responsible for different symptoms on different vars.

Mink (G. I.) & Shay (J. R.). **Preliminary investigations on Apple virus diseases.**—Abs. in *Proc. Ind. Acad. Sci.*, **68** (*1958*), p. 88, 1959. [Received July 1961.]

Apple stem pitting virus [**40**, 544 and above] was found in Indiana apple orchards associated with hyperplasia and hypertrophy of the parenchyma cells and a reduction in the functional conducting cells. R 12740–7A apple and certain of its progeny were sensitive indicators for apple mosaic virus, stem-pitting virus, and what is possibly a new virus disease, 'chlorotic leaf spot'. Most vars. were found to be latent carriers of stem-pitting and chlorotic leaf spot viruses.

Wang (T.-H.). [Report on investigations of Apple virus (painted face) in Shansi.] —*Zhibing zhishi*, **2**, 2, pp. 108–111, 6 fig., 1958. [Chin.]

Results of studies on 'painted face' virus of apple in Shansi as a basis for elaborating quarantine and control measures are reported from the Plant Quarantine Lab., Shansi Province agric. Construction Bureau. Two types of the disease are seen in dwarf apples, the 1st systemic, the whole tree becoming infected during fruit bearing, while in the 2nd clear symptoms develop only after several yr. of fruit bearing, usually starting with partial infection of branches and twigs, and becoming systemic within a few yr. Most symptoms develop after the surface of the fruit has become coloured, with bright red and green spots alternating, and green or yellow-green roughly circular patches of a few to over 10 mm. sometimes coalescing to form bands. The green part of the surface of the fruit is concave and that with the basic colour convex. Fruits are smallish, with firm flesh and low water content, and comparatively sweet.

Fruit 'patina' type symptoms occur on 1 var.; surface cracks on the fruit develop into longitudinal and horizontal brown fissures, with deformation of the fruit. Combined symptoms of 'fruit patina' and 'painted face' also occur. There is a striking similarity between the symptoms of 'painted face' and 'dapple apple' [cf. **39**, 179]. The spread of the disease is due to infected stocks or scions or to root grafts between healthy and infected trees.

Notes on Research and Investigation. —*Orchard.*, *N.Z.*, **34**, 4, pp. 123–124, 1961.

Eight apple vars. were treated with DPA [diphenylamine: cf. **40**, 55] at the Fruit Res. Div. and held under various atmospheres and temps. Jonathan spot was completely controlled and all fruit in controlled atmosphere was harder and greener after storage [cf. **38**, 528] than that not so stored. When stored until Sept.–Oct., Ballarat, Jonathan, and Delicious developed high percentages of breakdown but Rome Beauty, the most promising red var., developed internal breakdown by Dec., Golden Delicious and Granny Smith giving similar results. Sturmer was firm, crisp, and breakdown-free in mid-Dec. after 11 days at air temp.

In some gardens very extensive silver leaf infection [*Stereum purpureum*: **21**, 29] was found on old raspberry cane stumps, also on red and black currants in the Levin area.

Preece (T. F.) & Smith (L. P.). **Apple scab infection weather in England and Wales, 1956–60.**

PREECE (T. F.). **Spring rainfall and Apple scab in England, 1915–60.**—*Plant Path.*, **10**, 2, pp. 43–51, 5 fig., pp. 52–53, 1 fig., 1961.

Data are presented from the Plant Path. Lab., Harpenden, and the Met. office, Harrow, of Mills periods of leaf wetness (Mills, L. D. & Laplante, A. A. *Ext. Bull. Cornell agric. Exp. Sta.* 711, 1954), Smith periods (similar, but defined here as hr. of 90% R.H. or more after rain instead of hr. leaf wetness), and wet days, from 10 Mar.–30 May in the 5 yr. at a number of localities. Either Mills or Smith periods proved equally effective for forecasting outbreaks of scab (*Venturia inaequalis*) [cf. **39**, 115, 266; **40**, 230], which appear about 1 month after propitious Mills or Smith conditions. In addition to their occurrence over the country as a whole, such conditions may occur at other times in individual orchards or parts of them.

Data presented in the 2nd paper show that the total Apr. rainfall usually determines the severity of scab attacks in England; many years with a wet Apr. also had a wet May.

WILLIAMS (BARBARA J.). **Some host-pathogen relationships in the Apple scab disease.**—*Diss. Abstr.*, **21**, 6, p. 1328, 1960.

Tests at Univ. Wis. to detect the production of phytoalexins during the interaction of fleck-inciting *Venturia inaequalis* [**38**, 754] isolates and leaves of resistant apple vars. were negative. Germination of conidia in infection drops from such host-pathogen combinations was not significantly different from that in water drops from the same leaves. On sterilized media made from apple tissue the specificity of living tissue did not persist after sterilization. lines of the fungus growing equally well on preparations from susceptible and resistant vars. In resistant McIntosh respiration of infected tissue was no different from that of uninoculated leaf tissue, whereas in susceptible Cortland it increased as the disease progressed. Dialysed culture filtrates of lines 1096 (non-pathogenic to McIntosh, pathogenic to Cortland) and 365–4 (pathogenic to both vars.) grown in a simple synthetic medium both caused increased respiration of McIntosh and Cortland leaf tissue.

The only consistent difference between lesioned and flecked leaves was a greater quantity of asparagine in the former. No evidence was obtained that host specificity in wild-type lines of *V. inaequalis* is due to simple differences in amino acids between apple vars. and corresponding differential response to such amino acids by lines of the fungus.

WALLACE (J. E.), KÚC (J.), & WILLIAMS (E. B.). **The production of pectolytic enzymes by Botryosphaeria ribis and Glomerella cingulata.** —Abs. in *Proc. Ind. Acad. Sci.*, **68** (*1958*), p. 87, 1959. [Received July 1961.]

In Czapek's medium with citrus pectin as all or part of the carbohydrate source both fungi produced extracellular pectin methylesterase (PME) [**39**, 673] and polygalacturonase (PG). *G. cingulata* produced them also in Czapek's medium+0·2% L-alanine. Both fungi appeared to produce little or no extracellular pectin depolymerase (DP) in Czapek's medium alone or +pectin or +L-alanine. When Golden Delicious apples were inoculated with *B. ribis* [see below], appreciable quantities of PME and PG appeared, though healthy tissue of the same apples contained little of either.

WILLIAMS (E. B.). **Botryosphaeria ribis on Apple.**—*Proc. Ind. Acad. Sci.*, **68** (*1958*), pp. 108–109, 1959. [Received July 1961.]

B. ribis [cf. **38**, 266; **39**, 720 and above] is of potential economic importance throughout the apple-growing areas of Ind., successful isolations having been made from wood lesions in every area examined. Locally, Golden Delicious and Grimes Golden are very susceptible to fruit rot, while Rome Beauty and its red sport, Gallia Beauty, are specially susceptible to wood canker. Wounds are necessary before

infection can occur. Of many fungicides tested for 5 yr. chlorosulphane (N-chloromethano-sulphon-N-trichloromethano-mercaptoanilide) and panogen, applied in spring and summer, gave promise of controlling wood canker, while captan and phaltan, both alone and + Pb arsenate, applied throughout the summer, controlled fruit rot.

Struble (F. B.) & Morrison (L. S.). **Control of Apple blotch with fungicides.**—*Plant Dis. Reptr*, **45**, 6, pp. 441–443, 1961.

In orchard tests by Okla. agric. Exp. Sta., Stillwater, 1952–58, fermate (2 lb./100 gal.), dithane Z-78 and parzate (1·5), orthocide 50 (2), thylate (1·5), and omadine (1·5) reduced blotch (*Phyllosticta solitaria*) [**35**, 379] to 0, 1·4 and 0, 4–8, 3, and 5% when applied 2–3 times at 2-week intervals beginning at petal fall. Without spraying, blotch infection (21–76%) occurred chiefly 2–4 weeks after petal fall.

Hickey (K. D.). **The sooty blotch and fly speck diseases of Apple with emphasis on variation within Gloeodes pomigena (Schw.) Colby.**—*Diss. Abstr.*, **21**, 7, pp. 1699–1700, 1961.

Severe outbreaks of sooty blotch [**36**, 192] and fly speck (*Microthyriella rubi*) [cf. **35**, 24; **38**, 151] occurred in 1953–55 in Pa orchards sprayed with captan, thiram, or low conc. glyodin. *G. pomigena* was variable in spore form, septation, and colony colour on agar media, and its isolates could be placed into 4 groups based on the growth pattern produced on fruits. Isolates obtained from apple, *Rubus alleghenienensis*, *Salix nigra*, *Platanus occidentalis*, *Sassafras variifolium*, *Vitis cordifolia*, *Pyrus coronaria*, and *Rhus glabra* were pathogenic on apples. *M. rubi* was found on the 2nd.

The 1st infections by both fungi occurred before 21 June and were numerous on fruit exposed for any fortnight from 2 July–15 Sept. The incubation period of *G. pomigena* was 4–12 days on inoculated fruit in a moist chamber; inoculations on 45-day-old apples in the field needed 20–25 days. With natural infection in the field, incubation was 28 days on 42-day-old fruits, 15 days being the min. for *M. rubi*. Captan, ferbam, and zineb were toxic to both fungi, zineb least. Dodine and American Cyanamid Co.'s Fungicide No. 8599 inhibited *G. pomigena*, but the former was unsatisfactory against *M. rubi*. Glyodin and Pb arsenate inhibited sporulation of the former on slides, but neither fungus was inhibited on fungicide-agar media. All fungicides tested controlled both fungi if sprays were applied at least at fortnightly intervals, captan, thiram, and niacide-Z giving at least 40 days between the last spray and disease appearance, while zineb, phaltan, ferbam, glyodin at 1 qt./100 gal., and Pb arsenate with captan were effective at least 3 weeks longer than the former group.

Kegler (H.), Opel (H.), & Herzmann (H.). **Untersuchungen über Virosen des Kernobstes. III. Zur Histologie und Physiologie steinfrüchtiger Birnen.** [Studies on viroses of pome fruits. III. On the histology and physiology of stony pit of Pears.]—*Phytopath. Z.*, **41**, 1, pp. 42–54, 2 fig., 1961. [Engl. summ.]

Studies at the Inst. für Phytopath., Aschersleben, Germany, on fruits from trees inoculated with [pear] stony pit virus [**37**, 487].

Grasso (V.) & Lenzi (Anna M.). **Consociazione di Fusarium lateritium Nees e Roestelia cancellata Rabenh. su rametti di Pero.** [Association of *Gibberella lateritia* and *Gymnosporangium sabinae* on young branches of Pear.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, **18**, 1, pp. 23–29, 1 col. pl., 2 fig., 1960. [Engl. summ. 40 ref.]

In 1958–9 the 2 fungi were frequently found together on the young branches of

pear trees near Monte Amiata, Italy, their relationship being more a form of commensalism than of antagonism.

Nichols (C. W.) & Shella (T. A.). **Pear decline disease and its apparent southward spread along the Pacific Coast of North America.**—*F.A.O. Plant Prot. Bull.*, **9**, 3, pp. 39–42, 2 pl., 1960.

A brief account of pear decline in Calif. [**40**, 548], which is under investigation.

Aerts (R.) & Soenen (A.). **Trois ans d'expérimentation sur la tavelure du Poirier, Venturia pirina Ad.** [Three years of experimentation on Pear scab, *V. pirina*.] —*Agricultura, Louvain*, Sér. 2, **9**, 2, pp. 247–270, 1 graph, 1961. [Dutch, Engl. summ.]

Studies at Centre de Recherches de Gorsem ASBL showed that secondary infection by *V. pirina* [cf. **40**, 176] occurs more regularly than that of apple by *V. inaequalis*. Good control was obtained by following the same spray schedule as with apple scab [**40**, 54], early sprays being very important. The usual sprays sufficed to prevent infection both by conidia from wood lesions and by ascospores. The effect of all fungicides, including tuzet, wettable S (90% active substance), thiram (80%), and captan, was almost identical.

Beceresku (D.), Bucur (Elena), Lazăr (I.), & Vasiliu (L.). **Cercetări asupra agenților patogeni care produc ciuruirea frunzelor la sîmburoase.** [Investigations on the pathogenic agents of shot hole of stone fruit trees.]—*Comun. Acad. Rep. pop. Rom.*, **9**, 3, pp. 253–258, 5 fig., 1959. [Received July 1961.]

Examination at Sect. Fitopat. I.C.A.R. of twigs, leaves, and fruits from all parts of Romania showed *Xanthomonas pruni* [**40**, 581] and *Clasterosporium carpophilum* to be the causal agents of the disease, the former especially on plum and the latter mostly on peach and apricot. *Gloeosporium polystigmicola* [cf. **37**, 92] causes similar symptoms on plum trees.

Gourley (C. O.). **Control of Plum pocket disease in Nova Scotia.**—*Canad. Pl. Dis. Surv.* **41**, 3, p. 174, 1961.

At Canada Agric. Res. Sta., Kentville, N.S., several fungicides were compared with Bordeaux 8–8–100 on Burbank Japanese plum against *Taphrina communis* [cf. **27**, 481]. Complete control was obtained with a full dormant application of erad (10% phenylmercury acetate) at $\frac{1}{2}$ pt. 100 gal. or thiram 2 lb. 100 gal., the latter applied in spring or autumn, being recommended.

Kenknight (G.). **Spread of phony disease into Georgia Peach orchards.**—*Phytopathology*, **51**, 6, pp. 345–349, 4 graphs, 1961.

The spread of phony peach virus [**39**, 598] in a number of orchards followed in general the prevailing wind, a regular pattern being upset by obstructions. Various patterns are analysed and the data obtained are treated mathematically and discussed in relation to the ideas of Wolfenbarger [**39**, 274] and others.

Turri (E.). **Ulteriori prove sperimentali sull' impiego degli acuprici nella lotta contro la Taphrina deformans (Berk.) Tul. in provincia di Roma.** [Further trials of the use of non-copper materials in the control of *T. deformans* in the province of Rome.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, **18**, 1, pp. 79–92, 2 graphs, 1 diag. 1960. [Engl. summ.]

In further spraying tests against peach leaf curl (*Taphrina deformans*) [**39**, 598] near Rome, with 3% Bordeaux mixture and 0·5% cyprex, ferbam, and phaltan applied on 20–21 Nov. 1959, and 0·7% Bordeaux and 0·3% cyprex, ferbam, and phaltan on 22 Feb. 1960, ferbam and cyprex proved as effective as Bordeaux and significantly more effective than phaltan, and are recommended.

HINE (R. B.). **The role of fungi in the Peach replant problems.**—*Plant Dis. Reptr*, **45**, 6, pp. 462–465, 1961.

The difficulties of establishing peach trees in Calif. in old peach soil [cf. **36**, 476] are often greatly enhanced by the presence of fungi, especially *Pythium ultimum*, not previously known to be pathogenic to this host. Studies at Univ. Calif., Davis, showed that the most pathogenic strs. of this fungus were found on the soils in question, in which the commonest root fungi were spp. of *Pythium*, *Corticium*, and *Fusarium*.

WADLEY (B. N.). **Control western X-disease in sweet Cherries by top-working on Mahaleb rootstocks.**—*Fm. Home Sci., Utah*, **22**, 1, pp. 10–11, 22–23, 1 fig., 1961.

Experiments at the Utah Sta. of the U.S. Dept Agric. showed that when cherry trees are top-worked on a winter hardy mahaleb rootstock framework they become seemingly resistant to [peach] western X-disease virus [cf. **38**, 483]; if infection does occur, infected branches can easily be seen and removed. The virus seems not to move into the rootstock or into the cherry branches. This seems the only practical method of avoiding tree loss in areas where the virus limits production. In Md 2 mahaleb seedling selections. P.I. 193702 and P.I. 194098, imported from Russia, have proved 100% resistant so far.

GUALACCINI (F.). **Prove di inattivazione termica dell' agente virosico della 'maculatura lineare' del Ciliegio.** [Experiments on the thermal inactivation of the virus agent of Cherry 'line pattern'.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, **18**, 1, pp. 31–47, 1960. [Engl. summ. 26 ref.]

When small branches of a Francia cherry tree with severe symptoms of cherry 'line pattern' virus disease [**40**, 688] were dipped in hot water for different periods and at different temps. and the buds set in 1 yr.-old cherry seedlings, the virus proved to be not equally diffused throughout the infected branch and was not completely systemic in an infected tree. Treatment for 3 hr. at 45°–46° C. brought about complete inactivation: in heat-treated branches only 2 of the buds and 2 of the chips taken for budding were injured by the heat.

GROVER (R. K.). **Laboratory and field evaluations of antibiotics and synthetic organic fungicides used for the control of Sclerotinia fructicola (Wint.) Rehm. and Sclerotinia laxa Ader. & Ruhl on Cherries.**—*Diss. Abstr.*, **21**, 6, p. 1323, 1960.

S. fructicola [**38**, 707] and *S. laxa* are serious menaces to the sour cherry crop in Door County, Wis. Of 7 fungicides, including 2 antibiotics, selected for evaluation at Univ. Wis., actidione (especially actidione semicarbazone), phytoactin, and phygon were most effective in inhibiting mycelial growth and sporulation. Phaltan and actidione were very effective in inhibiting the production of pectolytic enzymes in culture. Actidione was thought to be translocated through the pedicel end of the fruit as it gave protection against rotting for a certain period, a protection which lasted longer against *S. laxa* than against *S. fructicola*. The *S. fructicola* isolate grew at higher conc. of cyprex, actidione, and phaltan while that of *S. laxa* grew at higher conc. of the latter 2 only.

Trees inoculated in the field were most effectively protected by phytoactin, actidione, and phaltan. The best control of brown rot on ripe fruit was achieved by actispray+fermate, phaltan+sticker, cyprex+actispray, cyprex, fermate, Bordeaux mixture, and actispray+phaltan. Griotte du Pays was resistant to *S. laxa* and Krassa Severa to both pathogens.

HUGUELET (J. E.), FULTON (R. H.), & VEENSTRA (M. A.). **Control of powdery mildew of Blueberry.**—*Plant Dis. Reptr*, **45**, 5, pp. 368–372, 1 map, 1961.

High incidence of powdery mildew (*Microsphaera alni*) of blueberry (*Vaccinium*

corymbosum) [**23**, 395] is reported from the Mich. State Univ., E. Lansing, to have occurred in nearly every plantation around Lake Michigan. Five applications of wettable S (6 lb./100 gal.), karathane (¾ lb.), and actidione (2 p.p.m.), in that order, gave the best control (11–12% infection reduced to 1–3%) in 1958–9. A spreader is essential: Niagara spray spread was selected as the best. Control by aerially applied S dust (4 applications) was as good as by sprays.

LOCKHART (C. L.). **Monilinia twig and blossom blight of Lowbush Blueberry and its control.**—*Canad. J. Pl. Sci.*, **41**, 2, pp. 336–341, 5 fig., 1961.

This disease, studied at Canada Dept Agric., Kentville, N.S., is now prevalent in N.S. and N.B. and its severity increases in the 1st and 2nd crop yr. after burning, especially if burning has been incomplete. Sclerotia of *Monilinia* [*Sclerotinia*] *vaccinii-corymbosi* [cf. **38**, 18] were found to remain viable for several yr. and from late Apr. to early June they gave rise to apothecia, which were smaller on lowbush blueberry (*Vaccinium myrtilloides*, and *V. angustifolium* vars. *laevifolium* and *nigrum*) than on highbush [*V. corymbosum*]. In culture the fungus at first produced macro- and micro-conidia, but subsequently only the latter; it could not be isolated from overwintered diseased leaves or twigs. Field (but not greenhouse) inoculations reproduced the infection. Good control was obtained by 3 dustings in June of ferbam 7, thiogreen, or thioneb (15 lb./acre). In practice the disease is combatted by burning every 2–3 yr., which destroys the overwintering mummy berries without killing the underground parts.

SCHÖNIGER (G.). **ENV-bedingte cytologische Veränderungen in Fragaria vesca L. und Einfluss der Infektion auf die Entstehung von Drüsenhaaren.** [Cytological changes in *F. vesca* induced by Strawberry necrosis virus and the formation of glandular hairs.]—*Phytopath. Z.*, **41**, 1, pp. 27–35, 2 fig., 1961. [Engl. summ.]

At the Inst. für Angewandte Botanik, Würzburg Univ., Germany [cf. **40**, 58], the pathological changes noted in the parenchyma cells of infected petioles were very similar to the normal behaviour of glandular hair cells of infected and healthy plants, which suggests that the former are something like 'glandular cells'. Infection and P deficiency increase the number of glandular hairs, the latter on the whole petiole equally, but the former on the basal more than the upper part. This suggests that the virus produces local P deficiency.

DAUBENY (H. A.). **Powdery mildew resistance in Strawberry progenies.**—*Canad. J. Pl. Sci.*, **41**, 2, pp. 239–243, 1961.

At Canada Dept Agric., Agassiz, B. C., Puget Beauty parentage (compared with Siletz, Surecrop, Talisman, Magoon, and Stelemaster) gave a highly significant increase and British Sovereign parentage (compared with Northwest and Agassiz) a significant increase in av. resistance to powdery mildew (*Sphaerotheca macularis*) [*S. humuli*: cf. **37**, 294]. Puget Beauty was the only parent to give many immune or resistant seedlings; Siletz was as resistant but did not transmit to the progeny.

KOTOVA (Mme V. V.). Побурение листьев Земляники, вызываемое грибом **Dendrophoma obscurans (Ell. et Ev.) And.** [Leaf browning in Strawberry caused by *D. obscurans*.]—*Bot. Zh. S.S.S.R.*, **6**, 4, pp. 574–576, 2 fig., 1961.

In 1955–58 *D. obscurans* was found in strawberry beds at the experimental farm of the Leningrad agric. Inst. The vars. Krasavitsa Zagor'ya, and Komsomolka were highly susceptible (65% of the leaves affected in 1957), Pavlovskaya Krasavitsa, Novinka, and Mŷsovka only slightly so. In the U.S.S.R. infection appears mainly on the leaves and more rarely on the stems. The ascal state was not found in the field.

Sequeira (L.) & Averre (C. W.). **Distribution and pathogenicity of strains of Pseudomonas solanacearum from virgin soil in Costa Rica.**—*Plant Dis. Reptr*, **45**, 6, pp. 435–440, 2 fig., 2 plans, 1961. [17 ref.]

Surveys by the Coto Res. Sta., United Fruit Co., Golfito, Costa Rica, of 20,000 acres of virgin woodland revealed wide infection of 3 native spp. of *Heliconia* by the banana str. of *P. solanacearum* [**40**, 551], the weed str. of which was also found on *Eupatorium odoratum*. The *Heliconia* isolates were pathogenic to young banana plants, but wilt symptoms developed slowly to give a typical distortion syndrome rather than rapid wilt. Pathogenicity then increased after serial passage through banana, suggesting that this host exerts selective pressure for increased virulence within the endemic population of the bacterium.

[Also published under Sequeira, L. in the United Fruit Co. *Res. Newsletter*, **7**, 1, pp. 1–7, 2 fig., 1960.]

Beccari (F.) & Cerri (P. G.). **Ricerche e prove di lotta contro le crittogame nocive al Banano. IV. I risultati di una spedizione sperimentale di regimi trattati contro il marciume del rachide, spediti in stiva refrigerata dalla Somalia all' Italia. V. Altre prove applicative sull' azione di un fungicida sintetico e di un fungistatico antibiotico sulle alterazioni patologiche dei tagli del rachide e dei traumi del regime di Banano dopo la raccolta.** [Researches and tests on the control of fungi injurious to the Banana. IV. Results of an experimental despatch of bunches treated against stem-end rot and transported in a refrigerated hold from Somalia to Italy. V. Other experiments on the action of a synthetic fungicide and a fungistatic antibiotic on pathological changes in stem pieces and injuries to the Banana bunch after harvesting.]—*Riv. Agric. subtrop.*, **55**, 1–3, pp. 52–74, 8 fig., 3 graphs; pp. 75–82, 1 diag., 4 graphs, 1961. [Engl. summ.]

In further experiments [cf. **40**, 482] both prinzon cos and basofix BM 117, used against stem-end rot (*Gloeosporium musarum*) [cf. **40**, 317] of banana bunches in Somalia proved satisfactory, basofix being the better as regards the contraction of the cut surface at the top of the stem, stem turgidity, and the compactness of the lower end, while prinzon gave better control of the progress of the rot in the stem, a more compact cut surface at the top end, and better inhibition of the mycelium.

In paper V the authors present experimental evidence confirming the fungicidal efficacy against banana stem-end rot of basofix BM 117; a conc. of 1:3 of mycostatin 20 in latex OMCC 522 is not high enough in practice, though exerting a strong fungistatic effect *in vitro*. Further work is to be carried out.

Klein (H. H.). **Effects of fungicides, oil, and fungicide-oil-water emulsions on development of Cercospora leaf spot of Bananas in the field.**—*Phytopathology*, **51**, 5, pp. 294–297, 1961.

In further tests at the United Fruit Co. Lab., La Lima, Honduras, Texaco 522 and Esso C oil, COCS, dithane M 22, tribasic Cu sulphate, and microgel were applied from the air and Bordeaux mixture from the ground, timing of application being based on streak counts of *Mycosphaerella musicola* [cf. **40**, 58]; a De Vilbiss atomizer was used for application in the laboratory. In fungicide-oil-water emulsions (of various proportions) there was no interaction but the oil improved fungicide coverage. The initial yellow streak symptoms were fewer in fungicide than in oil plots and least in those given fungicide-oil emulsions. On untreated and oil-sprayed leaves most of the conidia developed on the upper surface of the spots, but with fungicide treatment they were largely confined to the lower. Oil had no apparent protectant or antisporulant effect [cf. **40**, 317], but retarded streak development; correct timing of application is therefore essential. Aerial applications gave much poorer coverage of the young leaves than ground treatment.

Calpouzos (L.), Delfel (N. E.), Colberg (C.), & Theis (T.). **Relation of petroleum oil composition to phytotoxicity and Sigatoka disease control on Banana leaves.** —*Phytopathology*, **51**, 5, pp. 317–321, 1961. [12 ref.]

In further work at the Federal Exp. Sta., Mayaguez, Puerto Rico [cf. **40**, 317], the saturated, aromatic, and non-hydrocarbon fractions from heavy and light paraffinic and naphthenic oils were sprayed 4 times at 2-week intervals onto young Dwarf Cavendish banana leaves at 2·1 mg. oil/100 sq. cm. leaf surface [**39**, 431 and above]. Good control of *Mycosphaerella musicola* was given by the saturated fractions but all except that from the light naphthenic oil caused leaf flecking [cf. **40**, 481]. The other fractions were practically non-phytotoxic but gave no control. The saturated fraction from the heavy paraffinic oil caused considerable flecking at all deposit rates from 2·1 to 16·8 mg./100 sq. cm.; the aromatic fraction only at 4·2–16·8. Both gave similar control at 16·8 mg., but the saturated fraction was better than the aromatic at the lower rates.

Meredith (D. S.). **Botryodiplodia theobromae Pat. and Nigrospora sp. in the air of a Jamaican Banana plantation.**—*Nature, Lond.*, **190**, 4775, pp. 555–557, 2 fig., 2 graphs, 1961.

From the Banana Board Res. Dept, Kingston, the results are given of experiments with a Hirst spore trap [**31**, 618] inside a Lacatan banana plantation at St. Catherine. *Nigrospora* spores [cf. **6**, 758], extremely common, displayed a diurnal periodicity with a peak conc. at 8 a.m. and a low night level. Variation in absolute numbers was related to rainfall and humidity, the highest count being 20,000 cu. m. air during dry weather. The few spores of *B. theobromae* [cf. **39**, 433] trapped did not suggest definite periodicity except that there were usually none between 8 p.m. and 6 a.m. The highest record was 858 cu. m. (a clump of spores) but the av. daily mean only 8.

Stotzky (G.), Dawson (J. E.), Martin (R. T.), & Ter Kuile (C. H. H.). **Soil mineralogy as factor in spread of Fusarium wilt of Banana.**—*Science*, **133**, 3463, pp. 1483–1485, 1 graph, 1961.

Studies at 3 Res. Insts. in the U.S.A. and 1 in Honduras have shown that montmorillonoid-type clay minerals occur in all soils in which *Fusarium oxysporum* f. *cubense* wilt [**39**, 726; **40**, 480] spreads slowly, but except for 2 soils, this group of minerals was absent from those where spread is rapid.

Zentmyer (G. A.). **Chemotaxis of zoospores for root exudates.**—*Science*, **133**, 3464, pp. 1595–1596, 1961.

An expanded account is given of the chemotactic response of the zoospores of *Phytophthora cinnamomi* to avocado roots [**40**, 235], which, like the chemotropy of their germ-tubes, was directly related to infection and disease production.

Pettinari (Carla M.). **Istopatologia causata dal parassitismo di Cercospora cladosporoides Sacc. su Olivo.** [The histopathological condition caused by the parasitism of *C. cladosporioides* on Olive.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, **18**, 1, pp. 65–77, 6 fig., 1960. [Engl. summ.]

These studies of the behaviour of *C. cladosporioides* [cf. **33**, 739; **40**, 267] in organs of olive in Italy and of their reaction to infection showed that climatic conditions affect the manifestations of the disease. Generally, the fungus is unable to pass through uninjured bark but enters by cracks or lenticels; within the cortical tissues progress is usually intercellular. The fungus spreads over the leaf surface and enters by the stomata or through wounds. The mycelium remains for a time in the stomatal cavities and then passes between the cells to the palisade tissue. Sclerotia develop in areas with severe winters; they rupture the bark on infected branches,

or are present on the surface, and also on both leaf surfaces. They germinate at 23°–25° C.

The fungus is sometimes saprophytic, is frequently present on leaf and fruit stalks, causing these to fall prematurely, but not on flower buds or fruits.

Das-Gupta (S. N.) & Sen (C.). **Studies in the disease of Mangifera indica Linn. XII. Further studies in the effect of boron on Mango necrosis.** —*Proc. nat. Inst. Sci. India*, **26**, Part B (Silver Jubilee Number), pp. 80–87, 1960. [22 ref.]

Details of field experiments confirming evidence that B prevents mango necrosis [**40**, 60, 482].

Almandil (A. R.). **Chemical control of spoilage of Dates.**—*Diss. Abstr.*, **21**, 7, p. 1697, 1961.

The most active spoilage agents were *Aspergillus niger*, *Penicillium* spp., *Rhizopus* spp., and yeasts [**39**, 486], while side spot decay, caused by *Alternaria*, *Fusarium* and *Helminthosporium* spp., was mostly confined to the late Khalal and entire Rutab stages. On agar plates at Utah State Univ. captan and mycostatin were the best inhibitors. Fruits were more susceptible in the Rutab than in the Khalal and Tamar stages, the Kimri stage being the most resistant. Symptoms are calyx-end rot, with side spot lesions if the fruit is wounded. Captan at 500 p.p.m. was completely fungistatic for ca. 15 days at room temp. on heavily inoculated Rutab fruit, but even after 1 month 75% of the fruit was unspoilt. Mycostatin was less effective, dowicide A and filipin useless. After 25 days at 40–45° F. untreated Rutab fruit was unspoilt, while captan and mycostatin gave 90 days' protection.

Rainfall during ripening is an important factor of spoilage, which was found less in the centre of small well-aired bunches, where the fruit ripened earlier, than in larger ones. Storage temp. of 5–10° C. was best for all dates.

Coley-Smith (J. R.). **Hop diseases and the brewer.** —*J. Inst. Brew.*, **67** (**58**, N.S.), 3, pp. 231–235, 1961.

This paper from Wye Coll., Ashford, Kent, describes the characteristics of *Verticillium* wilt (*V. alboatrum*) [**40**, 421, 553], downy mildew (*Pseudoperonospora humuli*) [**40**, 422], and [hop] nettle head [**40**, 373, 552] and [hop] mosaic [cf. **40**, 179] viruses, with notes on wilt tolerant vars. and the importance of breeding for resistance to mildew. Efficient control of the 2 viruses will probably be possible when their manner of plant to plant spread is known.

Capretti (C.). **Oidio di Bixa orellana in Venezuela : Oidium bixae Viegas.** [Mildew of *B. orellana* in Venezuela: *O. bixae.*]—*Riv. Agric. subtrop.*, **55**, 1–3, pp. 13–19, 4 fig., 1961. [Engl. summ.]

The mildew, received at Univ. Los Andes, Mérida, from different localities in Venezuela was present on both leaf surfaces as pale grey, pulverulent or velvety, circular spots, a few mm.—several cm. diam., which frequently became confluent. Affected leaves were puckered and often malformed. Diseased plants were not seriously damaged, only a few leaves being infected. Small-scale trials with S dust gave satisfactory results. Pycnidia of *Cicinnobolus cesatii* [cf. **39**, 353] were found on the hyphae of *O. bixae*.

Zachos (D. G.) & Panagopoulos (C. G.). **The bacterium Pseudomonas sesami Malkoff in Greece.**—*Ann. Inst. phytopath. Benaki*, N.S., **3**, 2, pp. 60–64, 8 fig., 1960.

Bacterial leaf spot (*P. sesami*) [cf. **39**, 32] of sesame, reported for the 1st time in Greece, is described; it was found in several districts in summer 1959.

Reinking (O. A.) & Radewald (J. D.). **Cadang-cadang disease of Coconuts in Guam may be caused by a soil-borne plant virus spread by dagger nematodes (Xiphinema sp.).**—*Plant Dis. Reptr*, **45**, 6, pp. 411–412, 1961.

As *Xiphinema americanum* and *X. diversicaudatum* were found in Guam soil about the root systems of coconut palms in areas wholly infested with infectious yellow mottle decline disease (cadang-cadang) [cf. **40**, 553], it is suggested that the virus may be soil-borne and transmitted by these nematodes, and that transmission tests are warranted.

Moreau (C.) & Moreau (Mireille). **Inhibition de la croissance du Fusarium oxysporum Schl. par divers fongicides organiques.** [Inhibition of the growth of *F. oxysporum* by various organic fungicides.] –*Rev. Mycol., Paris*, **25**, 5, pp. 307–310, 2 graphs, 1960.

Tests by the authors' method [**39**, 4] of 3 strs. of *F. oxysporum* from the trunks of diseased oil palms growing in the Ivory Coast [cf. **38**, 157] showed that of 12 products used, the most inhibitory, judged by total efficiency, was 0·2% cryptonol, followed by 2% vapam, and then by 4% Zn trichlorophenate and oxyquinol. When compared according to the percentage of active ingredient, the order was panogen, cryptonol and oxyquinol, vapam and Zn trichlorophenate.

Onyschchenko (O. I.). Результати дослідження відокремлення здорових бульб Картоплі від вироджених. [Results of studies on the separation of healthy and degenerate Potato tubers.]—Допов. Укр. Акад. сіл.-гос. Наук [*Dopov. Ukr. Akad. sil.-hos. Nauk*], **3**, 2, pp. 7–9, 1960. [Russ. summ.]

At the Ukrainian sci. Res. Inst. for Vegetables and Potatoes infected (marked with indelible pencil) and healthy potato tubers were washed, dipped in ammonium nitrate solution, washed in water, and the sp. gr. measured with an areometer. The sp. gr. of spring sown Kur'er tubers infected by potato rugose mosaic [potato virus X+Y] was considerably lower than that of healthy. Starch content of healthy tubers at sp. gr. 1·115–1·096 was 20·7–20·3% and of infected at sp. gr. 1·092–1·082 20·2–20%. Similar results were given by summer sown tubers.

The drop and sp. gr. methods, used to estimate masked infection by virus X [cf. **40**, 424], were 70% in agreement at a high conc. of virus.

Webb (R. E.) & Schultz (E. S.). **Resistance of Solanum species to Potato viruses A, X, and Y.**—*Amer. Potato J.*, **38**, 5, pp. 137–142, 1961.

Nine selections of *S. tuberosum* (*S. andigenum*) proved highly resistant to both mechanical and graft inoculation with viruses A and X [cf. **38**, 536] at the U.S. Dept Agric., Beltsville, Md. Apparent immunity from X was found in selections of *S. acaule*, *S. sucrense* and 1 sp. hybrid. Four selections of *S. tuberosum* and 1 of *S. maglia* developed X symptoms, but the low titre evinced on subinoculation to indicators showed them to be poor hosts. One selection of *S. cardiophyllum*, 4 of *S. chacoense*, 3 of *S. demissum*, 2 of *S. hougasii*, 1 of *S. phureja*, 1 of *S. tuberosum*, 8 of *S. stoloniferum*, and 2 sp. hybrids seemed immune from mechanical inoculation with virus Y. Selections of some of the above, as well as *S. maglia* and 8 hybrid sp., seemed immune from virus A by graft inoculation; though half developed symptoms, the virus was not recoverable. No selection proved highly resistant to all 3 viruses.

Bagnall (R. H.). **Recovery of virus X from leaves of graft-inoculated immune Potato plants.**—*Phytopathology*, **51**, 5, pp. 338–340, 1961.

Details from Canada Dept Agric. Res. Sta., Fredericton, N.B., of the method used [cf. **39**, 487]. The virus was recovered from both leaves and roots of S 41956 by sap inoculation to *Nicotiana debneyi* and *Datura tatula*. Proof that infections of the

test plants were not due to contaminations was obtained by using recognizable strs. of virus X. It would appear that immunity from virus X is in fact due to a hypersensitive response resulting in extreme localization.

WRIGHT (N. S.) & HARDY (MARIE). **Fixation of complement by strains of Potato virus X.**—*Virology*, **13**, 4, pp. 414–419, 1961.

At the Canada Agric. Res. Sta., Vancouver, B.C., the complement fixing capacity of 12 isolates of potato virus X [cf. **38**, 615] was shown to be identical. The amount of each purified virus required to react optimally with homologous and heterologous antisera is expressed as an opt. antigen range. The isolates used (from Canada, U.S.A., and U.K.) included representative mottle and ring spot types.

SPRAU (F.). **Über eine Methode des direkten Nachweises des Y-Virus in verschiedenen Teilen der Kartoffelknolle.** [On a method for the direct demonstration of virus Y in different parts of the Potato tuber.]—*Ber. dtsch. bot. Ges.*, **74**, 5, pp. 164–169, 4 fig., 1961.

From the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, Munich, a method for transferring sap to tobacco plants [**40**, 237] is described. The tuber flesh is cut down round an eye to form a cubical platform to be used as handle. The peel and cortex are then removed and the flesh adjacent to the platform reduced to a flat disk suitable for rubbing. Using the area round an eye is desirable because the virus is believed to be concentrated there.

ŚWIEŻYŃSKI (K.). **Zmienność Ziemniaków przy rozmnażaniu wegetatywnym.** [Clonal variation in Potatoes.]—*Roczn. Nauk. rol.*, **81**, Ser. A, 2, pp. 415–420, 1960. [Russ., Engl. summ.]

For 3 yr. at the Potato Sta., Poland, from 1 healthy hill of each of the vars. Parnassia, Zołciak (Flava), and Kołobrzeskie (Aquila), 12 lines were reproduced in the greenhouse and 12 in the field. When all the lines were then grown in the field only 3 of the glasshouse lines were free from virus [**40**, 484], but all the field lines were. In similar experiments with potato seedlings several weeks old only the progeny of 1 plant remained free from virus.

GRAHAM (D. C.). **Control of Rhizoctonia solani on Potato by disinfection of seed tubers with organo-mercury compounds.**—*Europ. Potato J.*, **3**, 1, pp. 80–89, 7 graphs, 1961. [Fr., Germ. summ.]

As *R.* [*Corticium*] *solani* wilt disease can be serious in southern and central Africa, disinfection of 'seed' to be sent there is important. Further studies [**37**, 305] at Dept Agric. Scotland, Sci. Services, East Craigs, Edinburgh, showed that of 9 organo-mercury compounds tested, solutions of methoxyethylmercury chloride and ethoxyethylmercury chloride containing 100 p.p.m. Hg were the best disinfectants, even though not preventing all sclerotia from germinating. Addition of a suitable wetting agent enhances their effectiveness. The potential effectiveness of any such agent can be predicted by assessing the sinking time [cf. **38**, 301] (the time that a weighted skein of cotton yarn takes to sink in the solution); it can be enhanced by raising the dipping solution temp.

KNUTSON (K. W.) & EIDE (C. J.). **Parasitic aggressiveness in Phytophthora infestans.**—*Phytopathology*, **51**, 5, pp. 286–290, 2 graphs, 1961. [18 ref.]

At Univ. Minn., St. Paul, spray inoculation of Cobbler potato plants gave a fairly constant ratio of infection to sporangial conc. in the range 1200–12,000/ml. for each of 2 isolates [cf. **40**, 381]. Higher concs. somewhat obscured differences between isolates, space on the host surface probably being a limitation; lower concs. increased the sampling error, especially if germination was poor. In the greenhouse

at 20° C. infection became appreciable after about 4 hr.; subsequently infections/plant increased with time, but after 22 hr. some isolates caused 6 times as many lesions as others, whether or not they were of the same race, nor was speed of infection necessarily a function of speed of germination.

YAMAMOTO (M.) & HONDA (H.). **On the amino acid content in Potato leaves at different stages of growth and potato tubers infected by Phytophthora infestans.** —*Ann. phytopath. Soc. Japan*, **25**, 5, pp. 209–213, 1960. [Jap. Abs. from Engl. summ.]

Some quantitative variation in amino acid content was noted at the Shimane agric. Coll., Matsue, in potato vars. at different stages of growth and varying in susceptibility to *P. infestans* [cf. **39**, 731], though no definite conclusions were reached. Tubers of resistant vars. usually contained less glutamic acid than susceptible, and the aspartic acid content decreased with the development of infection. Infection also affected the amount of other amino acids in tubers.

ROER (L.) & TOXOPEUS (H. J.). **The effect of R-genes for hypersensitivity in Potato leaves on tuber resistance to Phytophthora infestans.**—*Euphytica*, **10**, 1, pp. 35–42, 1961. [Dutch summ.]

Potato breeding material containing R_1, R_2, and R_3, singly or together, was tested at the Inst. agric. Plant Breeding and the Foundation for Plant Breeding, Wageningen, Netherlands, for resistance of the tuber flesh to 5 races of *P. infestans* [**39**, 339; **40**, 557]. The tubers were wounded at the stem end with a small cork borer to a depth of ca. 4 mm. and a droplet of a zoospore suspension placed on top, but no special measures were taken to standardize suspension density. After storing at room temp. for 5 days the tubers were cut lengthwise, placed in wet turf, and covered with Dutch lights in a glasshouse at ca. 15° C. Observations on tuber necrosis and sporulation were made 5 and 10 days later. There was great variation in response [cf. **17**, 765], from extreme hypersensitivity with no visible necrosis to almost total lack of resistance. The effect of R_2 and R_3 in the tuber seemed very different from that in the foliage, but a correlated effect of R_1 is possible.

AYERS (G. W.). **The susceptibility of Potato varieties to storage rots caused by Fusarium sambucinum Fckl. f. 6 Wr. and Fusarium caeruleum (Lib.) Sacc.**—*Canad. Pl. Dis. Surv.*, **41**, 3, pp. 170–171, 1961.

Inoculation of 13 potato vars. at Dept Agric. exp. Farm, Charlottetown, P.E.I., with *F. sambucinum* f. 6 [*Gibberella cyanogena*: **40**, 243] in Jan. showed Sebago to be highly susceptible, some other vars. only slightly less so, while Irish Cobbler and F 5350 were quite resistant. Similarly several vars. also showed a degree of resistance to *F. caeruleum* decay [loc. cit.], notably Kennebec; Keswick was highly susceptible.

BUSCH (L. V.). **Urea-formaldehyde (UFC-85) for the control of Potato scab.**—*Canad. Pl. Dis. Surv.*, **41**, 3, pp. 167–168, 1961.

Confirmation was obtained at Ont. agric. Coll., Guelph, of results reported elsewhere [**39**, 36] that UFC-85 controls *Streptomyces scabies* on tubers, not only in extent but also by reducing deep lesions to small surface spots; there was a slight reduction in yield in 1960 but not in 1959.

AYERS (G. W.). **The susceptibility of Potato varieties to wilt caused by Verticillium albo-atrum Reinke & Berth.**—*Canad. Pl. Dis. Surv.*, **41**, 3, pp. 172–173, 1961.

Trials at the exp. Farm, Charlottetown, P.E.I., showed that this wilt [**39**, 614] is seldom propagated from inside the tuber flesh and that there is a correlation between var. susceptibility to external inoculum and its capacity for propagating the disease internally. Some Fredericton seedlings were highly resistant.

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